### ARCHIVES

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OF

## USEFUL KNOWLEDGE.

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#### EULOGIUM ON THE LATE WILLIAM WEST.

Read February 13th, 1810, by James Mease, M. D. before the Agricultural Society of Philadelphia.

POSTHUMOUS honours, whether they consisted in monuments, or in praise, have generally been confined to persons who have occupied the first ranks in civil society, or who have distinguished themselves by their military exploits or literary talents. Their examples for these reasons, are necessarily limited in their influence, because only a small number of persons can derive benefit from imitating them. Examples of virtue, industry, knowledge and usefulness, taken from the humble walks of life, are calculated to be far more beneficial in society, because a great majority of mankind are in a situation to be benefited by them. Of this class, the cultivators of the earth are by far the most numerous. The retired lives of humble agriculturists, do not indeed admit of a display of eloquence, nor would such a display suit the speaker; but it is hoped, that a few traits in the life of one of them, will prove interesting, particularly to a society founded for the purpose of promoting knowledge, economy and the improvement of the profession of which he was so distinguished a member.

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The venerable subject of this tribute of respect was born in the county of Delaware, a few miles from the farm he owned at the time of his death. He was the elder brother of the celebrated Benjamin West, who has done so much honour to himself, and to the state which gave him birth, by his talent, as an historical painter in England.\* The first years of his youth were employed on the plantation of his father, and at a proper age, he was put apprentice to a mechanic in the city of Philadelphia,—an oak cooper, at which business he continued until his 40th year, when he determined to become a farmer. The place he purchased, consisted of upwards of 100 acres, and although by nature of an excellent soil,† yet it had been so far exhausted, as to be incompetent to the maintenance of the owner, few and simple as his wants must necessarily have been.

The business of farming may be said to have been new to Mr. West, for although he had a general idea of the common operations of husbandry, yet he must have been very deficient with respect to the various minor details upon which so much of the success and profit of a farm depend. The land he bought was almost a common: there being scarcely a fence of strength sufficient to keep out whatever animal chose to walk over his fields, and they were covered with briars and weeds of every kind. In these respects his farm was not singular. All the

\* The family of Mr. West is traced as far back as Edward the third, in whose wars they distinguished themselves. One of his ancestors Colonel James West, after having signalized himself in the battle of Worcester, on the side of the republicans, embraced the pacific principles of Friends. The grand parents of Mr. West emigrated with William Penn to this country.

† The farm is situated in a tract of land about three quarters of a mile wide, which is remarkable for abounding in blue rocks of a very hard nature, and which when broken appear of the colour of newly cast metal; hence it is called pot metal rock; the composition of the soil of this tract is so good as to be proverbial, and in the field of a farm through which the vein partly runs, the difference in the appearance of the grain or grass on each side the line may be seen to a foot or two. The rock is the amphibole, or grunstein of mineralogists. The fact is mentioned with a view to give an opportunity of ascertaining whether any such connexion between fertility, and the presence of this stone takes place in other districts.

agricultural operations of the district were the reverse of what they ought to have been, and of what they now are.—There is still much room for improvement.

After fencing his land, by substantial inclosures, and clearing it of weeds, briars, and wild hedge-rows, he looked around for information, as to the best mode of conducting his farm. He saw cattle half starved in winter for want of food, and pinched with cold from deficient shelter, and but poorly fed even in summer. Grass was the result of the spontaneous, though scanty production of the soil after the crop of grain was taken off, or in a few cases, of natural rough meadow, or watered fields; but as the first of those resources was not in the power of all, and as the latter, if within their command, was neglected from indolence, or ignorance of the benefit to be derived from it, or of the method of effecting the improvement, the provision of hay was necessarily extremely poor: the consequence was, that the stock kept was small in number, or if the vanity of showing a large stock infected the farmer, they were of course but half nourished. In either case, manure was scantily made. Successive crops of grain exhausted the ground: the slovingly practice of sowing wheat or rye among the standing Indian corn was universal, and the cultivation of artificial grasses, especially of that great fertilizer red clover, which has done so much for Pennsylvania, was unknown. The cattle were therefore permitted to wander over the fields to pick up the slender provision afforded by nature, or to browse upon young twigs in the woods, to the certain destruction of the growing timber: grazing at that time was solely confined to the rich natural meadows on the peninsula, between the rivers Delaware and Schuylkill, and many farmers depended entirely upon them for the supply of their winter beef, and even for part of the hay for their live stock. In short, he found that the whole management of a farm was pursued not upon fixed principles, but in a random manner; the object appearing to be, to obtain as much from the land as possible, without regard to the preservation or improvement of the powers of the soil. With those facts before him, the prospect was extremely discouraging. He did

not pretend to any knowledge in farming; but what he saw and learnt were sufficient to convince him, that practices which neither enriched the farmer nor the land, could not be the most eligible, and he therefore determined not to adopt them; and as he could derive no information from his neighbours, he read what books he could procure on farming, and for the rest he depended upon his own judgment. At the day alluded to, the science of agriculture was at a low ebb in every part of the European and American world: the useful spirit for diffusing information by means of books, was not excited in this country, and even in Europe, scarcely any works of much note had appeared on agriculture, except those of Du Hamel, Lisle, and Tull. The merit of Mr. West was therefore the greater, because without the numerous helps which the modern farmer may have recourse to, derived from the works of those who have detailed the result of their experience, or from the good examples of their neighbours, he ventured to alter a bad system, and to establish a new one, which the experience of near half a century in this country has shown to be correct, and which has added to the pecuniary resources, and agricultural reputation of our state.

The chief part of the cultivated land in Pennsylvania, was in a course of tillage, and grain commanded but a small price. The business of grazing as already stated, was confined to a small district, and the inquiries he made satisfied him as to the superior profit arising therefrom, when compared to tillage. From this circumstance therefore, as well as from a partiality for that pleasing branch of husbandry, he resolved as soon as circumstances would permit, to lay down his land to grass.-What an undertaking at that time! and how was this to be accomplished? the introduction of red clover had taken place only a few years before, and with the exception of a few districts, was confined to the vicinity of Philadelphia: prejudice, the great enemy to all improvements, having opposed its progress among the cultivators of the soil. The great advantages however of this valuable grass, derived from the immense burthen which it produced, were soon seen by Mr. West, and he determined to avail himself of them.

Its fertilizing effects were the result of subsequent experience, the knowledge of which from the recent and partial use of the plant was yet to be acquired. Clover was therefore sown, and his fields soon bloomed with the novel exotic, affording him treble the quantity of hay, that ever had been known to grow in the vicinity, upon the same quantity of ground. But clover, valuable as it proved to him, and as it still is, he knew required to be renewed, and a permanent pasture was the object he aimed at, for he held it as a principle that every country was blessed by a native permanent pasture grass. How therefore was this to be obtained? It occurred to him that a visit to the peninsula, where native grasses abounded, and an examination of the soil on which they grew, might teach him something on the subject. He there saw that the whole soil was alluvial, and of course very rich, that luxuriant natural grass clothed the fields, and that the only manuring which they obtained, consisted of the droppings of the cattle; here then were the principles upon which the improvement was to be grounded. Manure was applied as equally as possible, to the surface of a rich bottom. Philosophically concluding that like causes must produce like effects, he determined to imitate the practice, and the result proved the accuracy of his deduction. The first object therefore to be attended to, was to bring his soil if possible, to the desirable state of fertility of the alluvial district, and this he knew could only be accomplished by the accumulation of manure. How therefore was this great desideratum to be obtained, and how increased? It was clear that the wandering of the cattle over the fields and roads or in the woods, could not add to the stock of this great requisite; for in the one case it would be lessened in quantity, and diminished in quality by the action of the elements upon it; and in the other, it would be totally lost. He therefore confined his cattle to the barn yard, during the winter, and to increase the quantity of manure, he, in the first instance plentifully strewed the yard with leaves from his woods, while the scanty crop of straw, corn blades and corn stalks, which his first course yielded, assisted in supplying food.

The sites of the old fences he had removed, the earth under the wild hedge rows which he had previously grubbed, were ploughed up, and together with that taken from the ditches he dug or cleaned out, was formed into composts containing a large proportion of lime; while every species of offal and vegetable matter about the dwelling house, and innumerable weeds while yet unripe, were added to the contents of the barn yard. He provided against drought by leading a spring from a considerable distance along his high lands, so as to irrigate at pleasure some of his largest fields. The precious water from the barn yard, which even to this day, is either entirely lost, or permitted by most farmers to run off in wasteful profusion over a particular field, was confined by the construction of the yard, and forced to increase the riches of the fresh materials which were continually in progress to the fertilizing heap. To all his grass grounds, previously cleansed of perennial weeds by fallow crops, he applied a compost manure early in the spring, always observing to accommodate it to the nature of the soil. He had the satisfaction to see the complete success of the practice. For as the artificial grasses declined, the permanent native green grass\* took their place, and only required a repetition of the practice, which caused its appearance, to insure its continuance; for many years he exhibited the only instance in the county, of an intire sward of green grass upon an upland farm, and of fields which had not been disturbed by a plough for upwards of thirty

The alteration of the farming system of William West, from the random plans of the country, did not fail to be noticed by his neighbours, and in some of them to excite animadversions; and as in every instance of deviation from prevalent customs or practices, predictions of failure without hesitation, and with great confidence were generally made. The event however, proved the incorrectness of their predictions. In the short space of three years, his supply of provender was so great as to enable

<sup>\*</sup> Pea viridis of Dr. Muhlenberg.

him to sell hay to a farmer who possessed a much larger tract of land than his own, and who had indulged himself most in observations upon "the town-man's farming." The people of the vicinity saw with astonishment, field after field, covered with heavy pasture, which formerly were distinguished by the great supply to the young people of fine blackberries; and in a few years, they were surprised to see 40 head of cattle brought to a farm to graze, which had scarcely ever afforded a bare support to ten head before; but they wondered still more when those cattle were successively led to the capital by the butcher, and moreover were informed, that a large dairy and farming stock were supported during the same season. Such a change could not fail of exciting more remarks than his deviating from the common agricultural system of the country, had formerly produced.-In the one case, some little pride was mortified, at seeing the successful practice of a citizen, in the improvement of land by courses which were so opposite to what farmers thought could not be altered for the better, or the adoption of measures which had either never reached their ears, or were slighted, from prejudice, or neglected from want of industry; in the other, the more feeling principle of interest operated to the production of remark, and to a gradual change of their agricultural operations. This change he lived to see effected, not only in his immediate neighbourhood, but in more remote places, and to behold farms, nay whole districts, brought from a state of poverty to a degree of high cultivation, by following the example he had long before set.

We are too apt to estimate the value of improvements, in a degree disproportionate to their value, when the theory that explains their success, or the practice of them has become familiar to us. We wonder that what is so easily accomplished, and is so simple, should have been so long concealed from us, or have been so recently adopted, and this remark will apply with particular force to the present occasion. The practice of producing a fine sward upon upland farms, by the application of manure to the surface, now appears so simple, that it strikes us with astonishment, the thought did not occur to others at a more early

period; but this wonder will cease when it is known that even to this day in many parts of the country, the benefit of it remains yet to be discovered. Men who believe the system of farming they pursue, admits of no alteration for the better, will of course despise all information derived from agricultural publications; and those who deem it a misapplication of time, or who are afraid that it will be deemed an acknowledgement of their own inferiority to go expressly to view the farms of others, will of course long continue in the practices of their forefathers, however erroneous, and adopt all suggested improvements with caution and reluctance.

It was indicative of Mr. West's disposition to improve, and an evidence of his freedom from prejudice, that he at a very early period adopted the use of gypsum as a manure; conscious that he had much to learn, he was always on the search for information, and he no sooner heard of the beneficial effects, which had been experienced from that singular substance on some of the city lots, than he made further inquiry respecting it, and saw and heard enough to satisfy him as to its utility. Without therefore hesitating as many did, because he could not account for the theory of its operation, he resolved upon its use. The first season convinced him that it was a most important acquisition to the farmer, and the experience of every subsequent year confirmed him in the opinion he at first had adopted. He defended it against the futile and weak objection which he frequently heard urged against it, that it acted upon vegetables like ardent spirits upon the human body, and like them must finally exhaust the powers of the land: he would remind its opponents of the means which it furnished of adding to the vigour of the soil, by means of the great quantities of manure afforded by the additional number of cattle, which could be maintained from the grass it produced, and which would tend far more to invigorate the soil, than the gypsum would to exhaust it. Much of the fertility to which his farm had reached, he ascribed to the use of that important substance, and his continued confidence in its powers occasioned the general and extensive use of it in his neighbourhood. The result of his experience with respect to its effects on grass, may be seen in the publication of the President of our society,\* and his remarks show that he had a correct notion of the points essential to the production of its full effects, and explain the want of success which sometimes follows its application to land.

The paper alluded to contains the only literary testimonial of his attention to agriculture. He was frequently importuned by his friends, to give to the world, a statement of the improvements he had effected, and of his practice in general, but he as constantly declined to comply. His uniform answer was, "Come and see, I can inform you more by conversation in a few hours, and by a walk over the farm, than by writing volumes." A visit to his farm was well repaid. The inquirer found always a hospitable reception, a pleasant companion, and saw every thing about the land bearing the strongest marks of industry, care and skill. The most luxuriant grass, the native production of the soil, every where met the eye; not a weed was to be seen; the fences in the most perfect order, a compost bed ready prepared or in preparation in the field next to be dressed, and every improvement effected in the most substantial manner, as if he had been just entering the farm early in life. His industry was indeed unceasing; for he held it as a point of duty, "in every

<sup>\*</sup> This is now annexed to the 2d vol. of the Memoirs of the Agricultural Society of Philadelphia, recently published by Johnson and Warner.

<sup>†</sup> Their backwardness to give to the public details of the progress of his improvements, which arose solely from his diffidence, is the more to be regreted, in as much as they would have been highly instructive to a young farmer. Few practical men are fond of committing themselves on paper. Neither Bakewell, the well known English improver of live stock, nor Klyiogg the Swiss, ever communicated their improvements to the world. But Mr. West did not, like the former character, wish to conceal his operations, nor like the latter undervalue written information: on the contrary, he set a just estimate upon all instruction whether oral or recorded, and often regretted the contempt in which our agriculturalists in general held all information, except what is derived from their own limited circle of observation.

<sup>†</sup> Mr. West had drawn up the outline of a communication to the British Board of Agriculture, but did not finish it.

man who occupies land, to endeavour as far as capable, to keep it in an improving state, for the benefit of himself, his connections, the public, and posterity; and that he who can make an addition or improvement, though small, to what is already known, would be doing more good than giving alms all the days of his life."\* But although he did not write for the public, he was always ready to serve it, and was often applied to for the purpose of viewing and selecting farms for those who wished to settle in the country, or called to give advice to beginners, a duty which he always cheerfully performed.

The construction of his stables, and the accommodations for his cattle, all designed by himself, are superior to most I have seen, and his stalls are referred to as models worthy of imitation, in two respectable British agricultural publications.†

Hitherto I have spoken of Mr. West only as a farmer. It is now necessary I should mention his merits as a man and a member of society. In these important characters he acted a part no less distinguished. He was scrupulously exact and honourable in all his dealings, and possessed a delicacy of feeling, and nice sense of honour, which we too often see wanting in men who maintain a reputation in the world. He abhorred every thing bordering on meanness or narrowness of conduct, and could not refrain from expressing his disapprobation, when informed of actions that partook of either. No man ever possessed a fairer claim to the amiable title of a good neighbour, and no man took more pleasure in bringing about a reconciliation between those families whose friendship or good understanding had been suspended. In the delicate and often trying situation of a divider of estates, a duty which he was often appointed to perform, he acted with a sense of justice that always gave satisfaction. Whatever was done by him, was the result of full deliberation and honest impartiality, and therefore was cheerfully submitted to, however contrary to expectation and the wishes of a party.

<sup>\*</sup> Address to the board of agriculture.

<sup>†</sup> Complete Grazier, and Edinburgh Farmer's Magazine.

His benevolence and liberality were alike free as prompt, and I may add disinterested in the highest degree. More than one farm has been purchased by his assistance, and numerous instances are known to me of ample pecuniary loans, without the smallest compensation. Against this he was principled. He had known the advantage himself of some capital, in the commencement of his agricultural operations, and therefore freely advanced it when convenient, to those proper objects whose necessities induced an application to him. He was of a cheerful disposition, and delighted in society, to which he contributed a great share of its charms; for he expressed himself with an accuracy of language, and precision of style, far above what might have been expected from one, whose education had been so much neglected in early life. He possessed a considerable talent for poetry, and has often in my hearing recited some of his compositions, which for imagery and ease of versification, would have done credit to many whose fame stands high in the list of poets. He possessed all the plainness of the religious society to which he belonged, and of which he was an exemplary member, joined to the manners of the well bred gentleman.

The confidence that his fellow-citizens reposed in him was repeatedly shown, by his frequent election as a member of the legislature of this state. The compliment was the more honourable, because it was never solicited. He seldom engaged in debates of the house; in a few instances however, he was induced to deliver his sentiments, and acquitted himself in so masterly a manner, as to convince his hearers, that if his natural talents had been cultivated at an earlier period, he would have distinguished himself as a public speaker,\* as much as he did in the peaceful

In one case, he replied, at the particular request of his friends, to an eminent counsellor in the house, and gave so clear a view of the subject in a short speech, that the question was carried on the side he espoused, by a very large majority. His opponent, afterwards requested that the subject might undergo a private debate before six gentlemen of the bar. The proposal was agreed to, and on the discussion of the question, the vote of the umpires was unanimous in favour of Mr. West.

occupation of an improver of land. The board of agriculture of England, having heard of his superior farm management, paid him the compliment of electing him an honorary member of their institution, shortly after its establishment.

Mr. West attained the great age of nearly 84.-His mental faculties retained their full vigour to the last year of his life. By an irresistible instinct of our natures, old age in any one commands respect. But this respect is combined with veneration, when we associate the sight of gray hairs, and other marks of the decay of the body, with ideas of virtue and eminent usefulness in an honourable occupation. Such were the feelings which the presence of Mr. West excited in every one who saw him, whether upon his farm, by his fire side, upon the road, or in company. The review of a long and innocent life is always pleasant, but when the mind in its retrospect upon past years, sees every one filled with labours for the benefit of country, family and friends, the sensations excited by it are more than pleasant,—they are truly delightful. But Mr. West had enjoyments of another kind in the evening of his life. They did not consist in viewing territories acquired by fraud or force, or fields stained with human blood. They were of a higher nature; they consisted in contemplating trophies of his conquests over barrenness, briars and thorns, in fields covered with the means of increasing the subsistence and numbers of men and beasts; in beholding the progress of improvements, upon upland farms, of which he had set the example, and in the tranquillity resulting from a well spent life.

After an illness of some weeks, which he bore with great composure, he calmly resigned his breath on the 6th December, 1808.

If in ancient times, the birth day of that man was deemed worthy of celebration who first pressed the grape, and taught man the use of its intoxicating juice; surely the memory of our own countryman will be held in grateful remembrance by posterity, when it shall be known, that he greatly contributed to increase the solid riches not only of our state, but also the wealth

and comfort of the farmer, which of late are so apparent, by the agricultural improvements he introduced, and by shewing how the earth may be made to produce a greater increase by the judicious application of labour.-In the domestic circle, we dwell with pleasing satisfaction upon the recollection of those departed friends, who have endeared themselves to us by good offices, virtues, and the kind courtesies of life; the patriotic mind will derive still greater pleasure from the consideration, that a long and active existence had been spent in labours calculated to promote the interest of the community at large, by improvements in a calling particularly suited to the genius and habits of the people; and the friend to religion and morality will feel happy in a knowledge of the fact, that with such great personal merit, the respected subject of this tribute was strict in the discharge of every duty, to that BEING from whom all blessings flow. reported but a country of a country of the property of the pro

# THE IRON WORKS OF SWALWELL

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From notes taken at Swahwell, near Newcastle on Tyne, in September, 1793.

AT Swalwell, and at the adjacent villages of Winlaton, and Winlaton Mills, is carried on an iron manufactory, conducted in a very singular manner. These places form a kind of independent republic, that, without violating the laws, exists almost without their assistance—a species of imperium in imperio, of which Ambrose Crowley, about the beginning of this century, was, at once, the founder and the legislator. From the profession of a common smith, he raised himself to the importance I have mentioned. The works which he established have descended with increasing prosperity to his heirs, and his laws still continue to regulate their operations, under the auspices of Crowley, Millington, and Co. These gentlemen principally reside in London, where their great warehouse in Thames-street still exhibits for its sign the leathern doublet of Ambrose Crowley.

This and the rest of our information, we collected from one who had served the company for forty years, being the oldest master workman in the place. The business, he informed us, was conducted by agents or clerks, who were the repositories and administrators of the laws of Crowley. To transact the business of the company, they hold a general council every Thursday, and a select committee every Monday; and, for the double purpose of issuing general orders to the artificers, and of deciding the differences which arise between the workmen, they are erected into a court, which is held at Winlaton once in every period of ten weeks.

The bench is composed of the principal clerks, assisted by the clergyman of Winlaton, which is a chapel of ease to the neighbouring parish of Whickham, and where duty is performed at the expense of the company. To these are added four governors, or popular magistrates; two of whom are elected by the workmen of Winlaton, and the other two respectively by those of Swalwell and Winlaton Mills.

It is by virtue of a summons from one of these officers, that a defendant appears with his witnesses to answer the attested allegations of a plaintiff. But whether the testimony is received upon oath, we could not learn; nor, what is much more extraordinary, could our host inform us if causes were heard and determined immediately by the bench, or by the intervention of a jury; for, by that species of negligence, which is the ruin of political constitutions, this man had wrought for forty years under the company, and had never once had the curiosity to attend a court before which he was every day liable to be called. In this space of time, however, if there had been a jury, he would have found the information which he did not seek; for it is very improbable that he should never have been summoned to perform that duty, or that he should never have heard of those who were, especially as he was a man of considerable property, and could even boast of having been offered a governorship, a place not only of honour and emolument, but perpetual, for which the candidate, according to his expression, canvassed like a parliament-

But however this be, the sentence of the court, pronounced by the president or chief clerk, is decisive in cases of debt, assault, peculation, abusive language, &c. and probably in all cases where the uncalled interference of the laws of the realm does not supersede the jurisdiction of this bench; for Crowley, aware of the ruinous expenses and fraudulent prolongation of suits at law, punished with an absolute discharge those litigious spirits who would not acquiesce in the equity of their own courts.

Thus careful to protect his men against extortion from without, he was no less vigilant in securing them from the arts of each other. A publican, therefore, in the court of Crowley, could have no remedy for debt, because he might be suspected of having lent the money, not through any impulse of benevolence, but of having offered it in the moment of indiscretion, and in the hope of seeing it employed in the purchase of his commodities; and if he prosecuted the suit at common law, he was immediately discharged.

Other debts, and the amercements awarded by the court, are levied by a tax upon the wages. By the trifling contribution, too, of a farthing upon every shilling earned by the workmen, the old and the disabled, the widow and the orphan, are preserved from want; and this is one of the few manufactories in Britain, that is not regarded by its parish with an eye of malignancy. Economy, however, is well observed in the administration of this elemosinary fund; for when those who were wont to be exercised in laborious employment, are disabled by accident, or rendered incapable by age, they are appointed by the agents to the performance of less arduous functions, where they enjoy repose, without the reflection of dependence; nor is age rendered only comfortable in itself, but happy in the prospect of its instructed offspring, who are taught reading, writing, and accounts, at the expense of the company.

Here, however, I cannot help remarking an error in the conduct of the proprietors, who suffer their pedagogue to make

ording to the claims of each,

terms with the parents of children that belong not to the works: and thus, at the time we visited the factory, his attention was divided among more than a hundred pupils. This number no longer appeared extraordinary when we were informed, that not less than a thousand men were employed in this manufactory; of this number, excepting those who were employed at the founderies, the forges, and the warehouses, each pursued his own avocation at his own home; for here every separate article of manufacture is sufficient to afford exclusive employment to one, and often to many men. By this means they acquire a celerity and adroitness far surpassing the dexterity of those whose attention is divided by a multiplicity of objects; and, as the workmen are paid by the piece, this power of execution is always preserved in activity. A boy, whom we saw fabricating a chain, made a link from a bar of iron, and added it to the rest, in less than one minute; for even boys here are urged to sedulity by an equitable recompense for their labours.

Corporation tyranny has not yet taught the successors of Crowley to exact from a man the labour of his youth, for teaching him
an art that may be learnt in his infancy. Here boys work for
some time before they are bound to an apprenticeship; but when
engaged, either to the company or an individual, they receive a
regular stipend, and at the end of their term, either commence
business themselves, or engage as journeymen with others. Indeed, what they call apprentices, seem to be only journeymen,
engaged for a particular term: thus our informant had a man
about 25 years of age, whom he had instructed in his business
of hammer-making, and had afterwards engaged, under the name
of an apprentice, to serve him for seven years, at a salary of 10s.
6d. per week. He employed several others at the same salary,
he discharging to the company their poor's-farthings, and the
company paying him for their work by the piece.

Our informant, like many other mastermen, frequently suffered his account with the company to remain unsettled for some months, only depositing his work in a general warehouse, where a regular account is kept, and an order on the pay-office is given ac-

cording to the claims of each. But this order is not the only certificate which is requisite to the passing an account at that office. A shop is kept by the company, where workmen may be supplied with common necessaries on the credit of their labour and the surety of their friends. Though the commodities here are as good in their kind, and as cheap as at other places of sale, the resort of the dependants is entirely a matter of choice. The institution seems to have been calculated to preserve those who were destitute of ready money from the fraud of the pawn-broker, and the extortion of the shop-keeper. It is, probably, the knowledge of this circumstance, which induces the more substantial artificers to buy in other markets, and which made our host solicitous to inform us, that he never frequented the shop. As no one, however, is excluded from the advantage, no account can be passed at the pay-office until signed by the agent at the shop.

We were enabled to form some idea of the importance of this extensive manufacture, when we were informed that not less than 500l. and sometimes 600l. are issued from this office every week. Within the limits of our informant's recollection, which comprised a period of at least forty years, the price of articles to the workmen had neither increased nor diminished, except in a very few particulars. The number of manufacturers too was not supposed to have altered, though the demand for the goods of the factory had increased. That the demand for labour should increase, whilst the number of hands remained the same, and the prices unaugmented, was a paradox that appeared to subvert every principle of economics, till we reflected, that the equilibrium might have been preserved by the increase of improvement of machinery, and the skill acquired by subdivisions of labour. A tilt hammer, in particular, we were told, had been lately erected at Winlaton Mills, of which the strokes were 520 in one minute.

The machinery at this place, as well as at the forging hammers and slitting mill at Swalwell, are amply supplied with water by the river Derwent; nor are they but very rarely impeded by the tide, which conducts to the doors of the factory, the materials of

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their work. This navigation, however, extends not beyond Swal-well: where, therefore, is the foundery, the anchor manufactory, and others of a heavy kind, whilst the lighter articles are fabricated at Winlaton and Winlaton Mills. They have no furnaces here to separate the iron from the ore, and they cannot even forge sufficient from what is called pig-iron to supply the artificers, but import very large quantities in bars from the Baltic. The very sand employed to form the moulds at the foundery, is brought from no less a distance than Highgate.

From viewing the works we went to visit the warehouse, where was quantity sufficient to astonish, and variety to amuse and inform. Here we were shown many instruments, of which we before knew not the existence; and, among the rest, one which suggested to our minds a striking contrast with the benevolence we had just witnessed in the institutions of Crowley. This was the head of a hoe, weighing four pounds, and intended for the use of the negroes in the sultry climate of the West Indies; and this, too, we were told was not the largest of its kind.

It is not very probable that they who thus impose on their fellow-creatures the yoke of real wretchedness, should show themselves indulgent to their imaginary scruples; or that they, who appear to have stifled the voice of conscience in their own bosoms, should attentively listen to its most fanciful dictates in another; yet were we assured, that the lamp-black and hard pitch with which we saw the old men employed, in besmearing the tools of the Europeans, to preserve them from rust, was never applied to those of the negroes, who would work only with polished instruments. Grindstones, we found, accompanied the implements exported to either Indies, for the tools were left unfinished in the edge, that less injury might be apprehended from the accidents of package and conveyance.

Among these, the singular form of the logwood axes attracted our notice. They were made (except in the aperture for the handle) exactly to resemble a wedge, of which the edge and the back were equally tempered, so that if one stuck in the wood, it was employed as a wedge, and, as they always work with two, a second was applied as a mallet. Cannon does not form an article of their stores or manufacture, except being employed as old metal, to be refluxed and converted into the more harmless implements of agriculture or culinary arts. Old anchors, too, we saw collected in great numbers, but these are more easily renewable into their old form (being entirely made by the hand and the hammer) than converted to any other purpose. The business of an anchor-smith seems to be one of the most important in the factory; we saw one, of which the number was marked 8,241, and the weight 8 cwt. 2 qrs. 20 lb. but learned that some were manufactured to the weight of 70 or 80 cwt. which might be easily credited from the specimens that lay around us.

Great as were the works which we had seen, we were yet surprised that we did not see more; for the quantity of waste iron must be so great, and the expense of its removal so considerable, that the erection of copperas-works seemed a measure of obvious emolument. The company, however, are contented to dispose of the materials, and leave to others the profit of the work.

ON THE PROCESSES AND UTENSILS EMPLOYED IN THE PREPARA-TION OF FLAX, AND IN THE MANUFACTURE OF LINEN, IN IRE-LAND.

By S. M. STEPHENSON, M. D.

[Prom the Transactions of the Belfast Literary Society.]

1. The Brake.—This was formerly employed, before the introduction of flax-mills, and where these are not erected is still used. It resembles a low stool, with great knotches called teeth, cut across it; a slanting handle is fixed in it, with which bundles of flax are beat upon a dry floor, till the bone is sufficiently broken; it is then made into handfulls called strikes. The workman holds one of these with his left hand, and lays it across an upright board, about four feet high, called a stock, and the broken bones, or shoves, are beaten out of it with a large wooden knife, called a scutching handle: after this it is scraped by the clove, hackled and fitted for the wheel.

2. Flax-mill.—The construction of a flax-mill may be conceived, by attending to the water-wheel and gears of a common grist-mill; but, in the place of the mill-stones, four wooden arms, like the spokes of a wheel, are attached to a wooden axis, which is in place of the spindle, and large wooden knives, or scutchers, are screwed to them. The edges of these are so perfectly arranged, that when their axis is turned around, they all move in the same circle. These scutchers are inclosed in the same manner as the stones of a grist-mill: openings are cut in the circular box, at such distances that the men may have room to stand, and handle the flax. Each man grasps a strike in his left hand, lets it into one of these openings with his right, and holds it to the repeated strokes of the scutchers, which strike it horizontally, and beat out the bone, then called shoves, or shows.

The severity of the machine having been complained of, a construction of it, in imitation of hand-scutching, has been in use in Ulster about fifty years. The scutchers, in this case, are fixed upon arms, attached to a horizontal axis, which by its motion, carries round the scutchers vertically, like the spokes of a cart wheel in motion, and causes them to strike the flax perpendicularly; three or four sets of such arms are fixed in the same horizontal axis, and one man attends each set.

Near each set of scutchers, two upright rails are placed in such a manner, that they may be moved by screws, or wedges, nearer to, or farther from the arms. To these rails, at a convenient height, a broad board is fixed, a stock, which is to support the hand that holds the flax; by moving it, the workmen can alter the force of the strokes at pleasure.

This part of the machinery might be improved, by the addition of two arms to each set, which at present consists of four; and by moving them one third slower, the strokes would be less severe, and the work almost as speedily done.

A foot flax-mill, in imitation of the above, has been long in use in Ulster. Six scutchers are fixed in a horizontal axis, as spokes are fixed in the nave of a cart wheel; to these a fly-wheel is screwed, and on the iron axis a crank is formed, which is dri-

ven by a treadle, in the same manner as a turner's instrument, or

The first, or horizontal construction of scutchers, requires a house two stories high: the rollers are on the ground floor, and the scutchers upon the loft, above the large cog-wheel. The entire machinery of a mill, on the vertical construction of scutchers, is on the ground floor. The motion of the rollers is given by falling, and the motion of the scutchers by the rising cogs of the same large wheel.

The construction of the rollers may be conceived by attending to the construction of a common calender. Three cylinders of hard wood, fourteen inches in diameter, are placed above each other, in two frames. The rollers for breaking flax, are fluted or indented, like the teeth of spur cog-wheels, which move each other; the upper and under rollers are about four feet long; the middle roller is longer than either of the other two; on one end of it, a small wheel is fixed, with teeth corresponding to the teeth of the large wheel which moves it. When the middle roller is turned, it turns each of the other two. The pivots, or gudgeons of the upper and under rollers run in rails, the tenons of which have room to move up and down in their mortises, which are cut in the upright posts of the frames. To the ends of these tenons, ropes, pullies, and weights are attached, which press the teeth of each roller into the grooves of another next it, and at the same time, allow the rollers to give way as the flax passes between them: a board, with a hollow in it, corresponding to the diameter of the middle roller, is fixed near it, on the side opposite to the man who attends them; this conducts the flax in its passage through the teeth, into the flutes of the middle and under roller, which by their motion, throw it out, on the same side into which it was put by the attendant. Watered, well dried flax is prepared for these, by binding small handfulls, called strikes, with a few of its stalks; when the top of one of the strikes is put between the teeth of the upper and middle rollers, it is instantly drawn in, passed down the back-board, and thrown out by the .s.screwed, and on the from axis a crack is formed, which is dr

under roller; this operation is repeated by the attendant, till the bone of the flax is sufficiently broken.

This is a most dangerous part of the machinery; the hand of the person who attends has often been entangled in a strike, and drawn into the rollers; many persons have lost their arms, and some their lives by them. Of all the inventions tried to prevent such accidents, none is so effectual as strapping the body of the man who attends them, to a post fixed in the floor behind his seat; this keeps him at such a distance, that his fingers cannot possibly be taken into them.

When the flax is broken by the rollers, it is carefully drawn, made straight, and every irregularity removed, that the scutchers may not draw it down among the broken bones or shoves; this part of the mill makes it ready for the hacklers.

The pins of the hackles are made of steel, and finely polished. Three such hackles, differing in fineness, are a set. Hackling is a separate trade. Hand-spinning need not be described. Spinning by water machinery, in imitation of cotton water twist, has been attempted with success; but has not produced yarn finer than four hanks to the pound.\*

The mechanism of the loom is familiar to most persons.

The flying shuttle was introduced into Belfast about thirty years agot by cotton manufacturers.t

3. Tuck Mill.—Consists of a very strong frame, with four posts, six or eight feet high, from five to six feet wide, and seven feet long. At one end a log is fixed, which occupies the entire end; this is hollowed out, so as to correspond with the side of a parabola inverted: this is called the head stock. Holes are made in it for streams of water to pass through. The sides are made up about two feet high, like a chest wanting one of the ends.

Dr. S. states that a young woman in the county of Down, spins so fine, that 64 hanks weigh only one pound. Many girls spin 20, and 30 hanks to the pound. † From 1808.

<sup>\*</sup> This great improvement is now rapidly extending through the United States.

open end of the frame is placed near the upper side of the axis of a water-wheel, which has two tripping bars in it, called wipers. From the top of the frame, two very large wooden hammers, with their heads downward, are suspended like pendulums, and called mill-feet. The ends of the feet next the head-stock are cut off diagonally, the bevel sides up. When all is at rest, except the water passing through the head-stock, there is a considerable space between the feet and the stock; into which, the cloth to be washed, is thrown. When the water-wheel is in motion, the tripping bars push the feet alternately against the cloth, and there press the foul water out of it: when the bar has passed the foot, it falls back. The weight of the water, and the curve in the head-stock, cause the cloth to fall so far down, as to equal a half, or a quarter turn. The same foot is immediately pressed up by the bar, while the second falls back. The alternate motion of the feet continue till the water passes through the cloth quite clear.

4. Of Rubbing.\*—Before the year 1730, rubbing-boards were in use in this country. These at first consisted of a board of hard wood, with grooves or knotches cut across it, called teeth. This was called a lier, and was placed diagonally in a large tub; it extended from the mouth of the tub on one side to the bottom on the other. The upper board consisted of a square log, with a handle fixed on the smooth side of it; teeth were cut in the opposite side, like those in the lier; this was called the runner. The tub had a hole in each side of it, through which a piece of cloth was drawn, when soaped, across the lier; then the piece was rubbed, or rather rolled, by working the runner up and down upon it, with both hands. When the part between the boards was sufficiently rubbed, the piece was drawn the breadth of the boards, through the holes in the tub.

When the selvages of a piece were badly bleached, it was fixed between two pieces of wood, with the selvages out, and they were

It is for the want of proper rubbing and beetling, that the American linens do not exhibit the finish of European cloth.

rubbed with the hand-board. As this method injured the fabric, a severe law was made against the use of rubbing-boards.\*

Although this was a great improvement upon hand-rubbing, it was insufficient, and expensive; a long board was then laid flat, and teeth of hard wood placed in it, near each end, and a ledge fixed on each side. The runner had teeth placed near each end likewise; it was placed between the ledges, with the teeth down, opposite the teeth of the lier. A handle was fixed at each end of the runner, with which it was wrought by two men, as large timber is cross-cut. The cloth was drawn as rubbed by a young person; this was laborious and insufficient.

About the year 1742, rubbing-boards were attached to watermills, at Claré foot, by James Stevenson and John Birnie; thus, the lying board had a large mortice cut in it; and fixed above the axis of a water-wheel, with tripping bars in it; these bars moved through this great mortice. The runner had a small mortice through the middle of it, at one end of which was a strong piece of wood fixed, which extended a few inches above and below the board, this was called a tongue. When the runner was placed above the lier, and the water-wheel put in motion, one of the bars touched the tongue, and moved the board up the water. The contrary motion was performed by a crooked lever, which consisted of an axis with two arms fixed in it, at right angles to each other; this axis was suspended in the frame of the boards, upon gudgeons, in such a situation that one of the arms touched the tongue, and the other extended toward the great axis of the water-wheel. When a bar had pushed the board up the water, and left the tongue, it came into contact with the lower arm of the lever and moved it, so that the upper arm of the lever acted on the other side of the tongue, and moved the board down the water. This construction was called the tongue and lever-boards, but the execution being attended with diffi-

<sup>\*</sup> If any bleacher of Linen Cloth shall use, or suffer to be used, any rubbing-boards, he shall for every such offence, forfeit 10l. to the informer. The finding any such rubbing-board in any bleach-yard, shall be sufficient evidence. 2d George I.

culty, the lever was left out, and a long slender pole called a spring-pole, was attached to one end of each board, which acted in opposition to the tripping bar; as soon as this moved the board up and left it, the pole moved it in the opposite direction; in either of these modes a number of pairs of boards could be attached to the same water-wheel; when this was the case, one man could not soap and draw the cloth through the boards with sufficient attention and regularity. About the year 1758, it was drawn by pullies, almost in the same manner as a kitchen jack is kept in motion. This operation is now performed by two fluted rollers, which are made to work in each other by the machinery of the mill, like the teeth of wheels; when a piece is put between them, they draw so regularly and so conformably to the motion of the boards, that every part of the cloth gets equal strokes of the boards. Bullquit dam loof u-tolky a

While the water-wheels were small, and they were driven with a quick motion, those parts of our machinery were supposed complete; but when the wheels on the mountain streams were made twenty-five or thirty feet in diameter, the motion of the axis was too slow for this construction, wherefore the velocity required was produced by tooth and pinion. The boards are now moved with cranks at the rate of one hundred double strokes in a minute.

The weight of the boards, the size and hardness of the teeth, and the quickness of their motions, gave them such a terrible appearance, that many complaints were soon made against them to the Linen Board.

Itinerant men were appointed to examine the alleged bad effects of boards, and they found that the cloth was not rubbed upon the unequal surface of the teeth, so as to injure the fabrick, but that it is only rolled briskly between them, freed from the downy part of the threads, and the pieces are thickened, and made narrower by them, consequently the boards were tolerated, and the act against them has been since repealed.

5. Beetling .- When the pieces are bleached, blued, starched and dried, their appearance is rough and irregular; this is most VOL. II.

perfectly and conveniently removed by beetling. This operation was performed by rolling the pieces upon smooth turned beams of hard wood, and persons standing on each side of the beam, opposite each piece, who struck it alternately with beetles, the beam at the same time was regularly turned until the operation was finished.

The expense, the tediousness and painfulness of this operation, and the great improvements made in all the other bleaching utensils, suggested the possibility of performing it by a mill also. The first invention consisted in fixing the shafts of several rows of beetles, with a hinge in the shaft of each, to a round beam with gudgeons in the ends of it, so that it could be turned round its axis with great velocity. This motion caused the beetles, by the centrifugal force, to extend like the spokes of a wheel, and strike with force any thing within their sphere, and consequently to beetle cloth upon a beam placed in a proper situation; after the stroke, the shafts bent, and the heads slipped down between the two beams; only one of this kind was finished.

The stampers of a paper-mill on the old construction, erected in Clowney, near Belfast, suggested to Bell, a workman near this, the idea of an engine for beetling by water-mills. His beetle, like a hammer, consisted of a square head with a shaft about eight feet long. A row of such, the length of the cloth beam, was fixed in a frame; each shaft was several inches through its head, and a beam, since called a wiper-beam, to distinguish it from the cloth beam, because it had a wiper in it corresponding to each beetle, was placed before this row; as this beam turned, each bar lifted and let fall its corresponding beetle.\* The lower end of each beetle was made circular, like the round figure of the hand beetle; this occasioned the cloth to appear rowed like ridge and furrow. The heads were then fixed upon the shafts diagonally; this too was insufficient, as the beetles could not be made to move from side to side; the cloth beam was cut short, then

<sup>\*</sup> Mr. John Henry, of the county Antrim, for whom the first beetling engine was erected, merited part of the honour of this invention.

the man who turned it, gave it two motions, a rotatory and horizontal, or traversing motion. The performance of these motions by hand was attended with expense and inaccuracy. The rotatory motion could be easily given from some part of the machine, but the combination of the horizontal with it, was attended with difficulty. Mr. Lang, near Newry, in some measure, removed this difficulty by connecting the beetling-beam with a roller, which had a groove cut in it, of the form the beam was intended to be traversed. One end of an iron bar was fixed in the floor, the other was placed in the waved groove of the roller; as this roller and the beam turned, the bar pushed them backward and forward horizontally, while they received a rotatory motion from the machinery, by these two motions the beam was traversed under the beetles. This horizontal motion is now more simply and easily given by a crank.

As long shafts in engines took up much room, and were often shattered and broken, they were troublesome and expensive. About the year 1756, beetles were made with such shafts as are used in mills for lifting stampers, for stamping ores; each beetle should strike from sixty-four to seventy-two times in a minute.

The last utensil used in finishing a piece, is named by our workmen "clips." This consists of two large blocks of wood, attached by strong hinges; in each of these is a hollow, suited to the size and form of a lapped piece; one of these blocks is fixed to a form, a lever is fixed upon the other; a side view of this resembles nut-crackers upon a large scale. This lever is wrought by a screw, the box of which is turned with a lever also; when a piece is lapped, a proper form and solidity is given to it, by pressing it in this machine.

In the construction or improvement of a set of works of this kind, the mechanic or engineer will determine that the waterwheel, if made with close buckets, shall move with such velocity, at the circumference, as near as may be to four feet in a second, and will proportion the intermediate gears so, that the motion of each part shall suit the work to be performed in the manner described. If the wheel is to be made with open buckets, it must

be of such a diameter, that the velocity of the circumference, shall be between one-third and one-half the velocity of the water when it strikes the float-boards.

The operation of the several modes of bleaching linen, as described by Dr. Stephenson, was given in the first volume, p. 166.

PROJECT OF A SIMPLE, EASY, AND CONVENIENT MODE FOR WA-TER-ROTTING FLAX, ADAPTED TO THE CLIMATE AND LOCAL CIRCUMSTANCES OF PENNSYLVANIA, &c.

ADDRESSED TO THE EDITOR.

#### By JOHN LANG.

FLAX has long been raised in Pennsylvania to a considerable extent; but the principal object of profit has hitherto been the seed. Hence it is sown exceedingly thin, and left standing on the ground till the seed is fully ripe; the consequence is as might be expected; the flax is as coarse as it could be produced, if coarseness had been the object sought for. After the seed is threshed, the flax is spread out upon the pasture ground, or the winter grain, where it remains till it is sufficiently rotted to prepare it for the succeeding operation of braking. But as this mode of rotting never renders the woody part of the staiks sufficiently friable, it is found necessary to roast it on fire, to make it brake with ease; by which means, it is rendered still more coarse, hard, and stubborn, than it would otherwise be.

But the worst consequence attending this mode of rotting is, that it fixes the colour upon the flax as effectually as any common dye; so that it never can be bleached to a good white. Even the white to which it is brought for labourers' shirts, &c. requires more than double the time and labour which would be necessary to make it a good white, if it had been water-rotted; consequently, what labour is saved by rotting on the grass, (if any) is more than lost in the trouble and expense in bleaching, besides the imperfect state in which it is finished. This mode of rotting was such as might be expected from the first settlers,

and their posterity have never seen nor known any better; and the Europeans who come here, (though they know better) naturally fall into the long established habits and customs of the country. Coarse flax will indeed, always be found useful for many purposes; but the time has already arrived, when owing to the rapidly increasing population of the country, and the wealth and prosperity of the citizens, many luxuries and conveniences are wanted which were not formerly thought of. Fine linen is now worn, not only by the inhabitants of our cities, but partly by the farmers all over the country; so that if our whole supply for this article depended upon importation, the expense to the nation would be very great. Whereas it is evident, to any one who will contemplate the subject for a moment, that it is fully in our power at least to supply a part, if we should not be inclined to supply the whole of this vast consumption, (which will be daily increasing,) by our own industry. There is perhaps no country in the world which for soil and climate, and other local circumstances, is better adapted to the culture and management of fine flax than Pennsylvania. I know the generality of our farmers will think it impossible to raise finer flax than they have seen raised; and many of them would stare, if they were told that nothing more is necessary, but to sow twice, thrice, four, six, or even ten times the quantity of seed upon an acre, they usually sow, according to the degree of fineness wanted; and to pull the flax before the seed is ripe.

The subsequent management may be as follows:—it is well known, that many farmers in Pennsylvania have their meadow banks watered by ditches carried along the highest part of the bank, from which the water is made to spread over the whole; it is proposed that one or more pits should be sunk in a sloping part of the bank, in the form and manner of tan-pits. They may be made within two feet of the lower edge of the ditch, or as near as may be, so as the water may not soak through the soil into the pit any more than is let in from above. The pits may be from three to three and a half feet deep, and five or six feet in the side of the square; they must be lined, bottom and sides, with plank, bedded in clay, to prevent the water from

soaking through. But previously to this lining, a cut must be made in the lower edge of the pit, to where the surface of the bank comes to a level with the bottom. In this cut is to be bedded a bored log, or hollow tree, which must reach the whole length of the cut, from the bottom of the pit to where it comes out to the open air below, one end to reach a foot within the pit, and so low that its upper surface may be upon a level with the bottom planks. A round hole must be made in the upper side of the log within the pit, and close to the side planks, into which a plug must be inserted, which should be so long as to reach the surface of the pit, so that a person standing above may pull it out and let off the water.

The size and number of the pits may be varied at pleasure,\* but the depth should always bear a proportion to the height of the flax when standing upright, so that the tops may reach within a few inches of the surface; which should be perfectly level, that the water may be made to flow completely over it when full. Pits prepared in this manner, will last good for a number of years without any repairs whatever; only it will be found necessary to keep them covered to prevent any thing getting in: and if it is found that leaves and mud, &c. have collected in them, they must be cleaned out, and the sides and bottom scrubbed with a hickory broom, and the dirty water let out by the plughole before the flax is put in. When the flax is pulled, if it is seed flax, it should be bound in bundles, and set up in shocks: some make bands of the flax, but as this is attended with waste, it is better to use rye straw, which serves the purpose equally well. When perfectly dry, the seed may be threshed off, and the bundles put away in a corner of the barn until a convenient

<sup>\*</sup> Let two pits be made in the manner above described, only of an oblong form, say ten feet by four, more or less; let first one be filled and covered, and leave it till within one day of the time it should be taken out, when the second pit may likewise be filled. The contents of the first being now sufficiently done, the business of taking it out, spreading, and filling the pit again, will occupy the time till the second pit is ready to take out. And so in rotation, one after the other. By this means the hands on a farm may be kept in constant employ, from the beginning to the finishing of any quantity of flax.

time for carrying them to the pit for rotting. If it is intended for fine flax, and is pulled before the seed is ripe, it would be better to carry it to the pit at once, without drying, as the rotting operation will be sooner performed, and the flax be whiter. Flax may be rotted in the hottest weather with safety, only it must be observed, that in warm weather the operation proceeds so rapidly that the strictest attention will be necessary to observe the precise time to take it out, as in a short time it may be over done, the putrid fermentation coming on so quickly. It will therefore be better for those who have not much experience, to put it off till the month of October. In this case, the fine as well as the seed flax, may be bundled up and dryed; and as some of the bolls will be ripe, the seed may be threshed off: though it will not be marketable, it will be useful for many purposes, and the flax be more handy for the succeeding operation.

We next come to the operation of rotting: the pit or pits being prepared, clean and empty of water, and the flax carried to the spot, the plug being made tight in the hole to prevent any water getting through; let one person stand in the pit, and as a second person hands the bundles to him from above, place them upright, with the roots down and the tops up, beginning at one side, and so continuing row after row, observing always to press the bundles together, that no vacant space may remain between, but the whole be formed into one uniform mass, which causes the flax to rot equally. When the pit is so full, that the person has no more room to stand, let him step out, and from above put in a bundle or two to fill up the place where he stood. This being done, the next thing is to let the water in from above, by means of a small cut and damming the water in the ditch. When the pit is filled with water to the brim, stop up the cut, so that no more may flow over from the ditch at that place, and cover the whole over with planks, to exclude the sun and air. After a certain time, shorter or longer, according to the temperature of the weather, one of the planks must be raised up, and a few stalks of the flax taken out and examined daily, to observe when the flax will part freely from the stalk; and when it is found suffici-

ently done, pull out the plug and let the water run off. As soon as the water is completely drawn off, the flax must be taken out, because in a short time it would heat, and be ruined by the putrid fermentation. The flax boors of Flanders, (as they are called,) know so well by long experience, when it comes to the precise point of rotting, that they never spread their fine flax on the grass at all, but dry it from the pit; by which management very little tow is separated by the hackle, the filaments divided ever so fine are so much tougher, and the bleaching of the goods made from it is so much sooner performed. In this case, as in many other instances, both in the culture and management of flax, they pretend to possess valuable secrets, which are transferred from father to son. I think it can be no difficult matter for any person, by repeated observations, to acquire the same experience; only for two or three trials at first, it will be adviseable to take it out a little sooner, and spread it a few days on the grass, as it is the constant practice in Britain and Ireland. those countries formerly known by the name of the French and

## Austrian Netherlands; the culture and management of which required the greatest nicet SARAMER understood only by a that

The advantages of this mode over the common mode of water-rotting, will be evident. In the one case, by the flax being placed upright, and equally pressed together, the whole mass being equally saturated with water, the process of rotting must of course be uniform, no part being more exposed than another. For this purpose, the flax boors above-mentioned, when they rot their very fine flax, do not make it in bundles when they put it into the pit, but make one rope embrace the whole quantity in the pit at one time, and the facility with which a small quantity can be taken out to be examined, enables them to ascertain the

<sup>\*</sup>When the water is let off, it will be observed, that a quantity of slimy matter will be left deposited on the flax: to remove this, it may be adviseable to peplace the plug into the hole, and fill the pit with fresh water a second time; then agitate the water with a stick, only so much as not to disorder the flax, then let off the water as before. This may be repeated, if necessary; after which the flax will be perfectly clean.

groper time for taking it all out. Whereas by laying the bundles horizontally upon the bottom of a creek or pond, (perhaps a clay or gravel,) the lower part and middle of the bundles are generally very little altered, while the upper surface, which is more exposed to the influence of the atmosphere, is over rotted. This circumstance, with the difficulty of extracting a small quantity for examination, makes it always necessary to take it out a little too soon, and finish the rotting on the grass.

Besides, the objection of rivers, brooks, &c. being infected and rendered unwholesome, is hereby completely obviated, and the water in which the flax is rotted, instead of becoming a nuisance, will serve a valuable purpose; by making it spread over the meadow bank, it will be equal to a moderate top dressing with dung; and from this circumstance alone the farmer will be more than repaid the interest of the original expense of forming the pits.

Fine flax has long been cultivated to the highest perfection in those countries formerly known by the name of the French and Austrian Netherlands; the culture and management of which required the greatest nicety, and was understood only by a class of people who followed it for a living. From this was manufactured the fine French cambrics which took their name from the city of Cambray; likewise the fine Lisle thread and the beautiful laces wrought by the nuns. When the Protestants were driven out of France, by the revocation of the Edict of Nantz, in the reign of Louis XIV, a company of weavers came and set up a cambric manufacture in the neighbourhood of Edinburgh, and named the place Pickardy, from the province in France, whence they came. This continued many years; and they imported all their yarn from France. And when the fine lawns were manufactured to a great extent in Glasgow and places adjacent, previously to the muslin, all their yarn was imported from France, above 12 doz. to the lb. some of which was so fine as to exceed 60 doz. per lb.; each dozen containing 12 cuts, and each cut 120 threads, upon a reel 90 inches round.

This fine yarn was prohibited by law, to be exported from vol. 11.

France, except in a partly manufactured state; to evade which law, it was all warped into chains, as if ready to put into the loom. These chains, which were only from 7 to 10 yards long, and run with 8 threads, were all undone and spooled over again, and warped into webs 150 yards long. About the year 1773, a person was brought to the neighbourhood of Glasgow, to teach the method of cultivating, rolling, and preparing fine flax; and in the year 1775, the writer of this article, saw in the store of Mr. Stenhouse, yarn merchant, above the Cross, Glasgow, a parcel of yarn spun from Scotch flax, raised and managed in this manner, as fine as 40 doz. per lb. It appears, that about the year 1782, the fine thread manufacture was brought to such perfection. that in one house in Paisley, 12 mills were driven by one horse, turning in all 576 spools. This was sold under the denomination of Lisle thread; the yarn from which it was made will average 32 dozen to the pound: at that period there were in Scotland not less than 500 thread mills; 200 of which were employed in the above kinds of fine thread, and consumed upon an average 96,000 dozen of yarn each, per year. The whole thread manufacture of Scotland at that time, was calculated to consume 4,320,000 dozens of yarn annually; and was managed in all the various operations from the flax to the finishing of the thread, by upwards of twenty thousand women, besides four or five thousand men. See Brown's History of Glasgow, Vol. II, page 281.

The above is merely brought forward, to prove the certainty of the United States being able to produce flax sufficiently fine for all the purposes we shall want, and the whole may be included from 2 to 8 doz. per lb.; and I shall be bold to say, whoever will make trial of the above described method of rotting flax, will find it attended with the least expense and trouble of any other, besides answering the purpose to full satisfaction; and the flax so rotted will not need to be roasted by the fire, the heat of the sun being sufficient to make it work freely: but above all, the great saving in the article of bleaching, besides the superior texture and durability of the cloth or thread made of it, will be a sufficient recommendation to the public.

#### OBSERVATIONS ON SHEEP AND WOOL.

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#### TO TOBACCO PLANTERS AND SHEEP BREEDERS.

on Lincolnshire" in England, that the whole land in that county is 1,848,000 acres; having on them 2,400,000 sheep of two\* heavy fleeced breeds, producing 21,610,000 pounds of wool, selling at one-sixth of a dollar (or 9 pence sterling) per pound. The whole value of unmanufactured wool is 810,000/L sterling; equal to 3,600,000 dollars. This, at our prices for wool, would be equal in value to all the American cotton exported from the United States in a year, being seven or eight millions of dollars. The weight of this wool is greater than the weight of all the sheep's wool yet made in the United States, in any year.

When it is considered that the quantity of land in Lincolnshire (G. B.) is not more than one fifteenth of the land in Pennsylvania, or in New-York, a tenth of South Carolina, or one twelfth of North Carolina, there can be no doubt of the immense capacity of the United States to produce wool. The county of Lincoln (G. B.) is in a great part fenny or marshy: in part it is heath: in parts dry and rich. Some of the fenny districts produce fleeces of fourteen pounds.† Our richest drained swamps would be excellent for such sheep.

Mr. Young states, that the average of the Lincolnshire sheep, of the two different breeds, is nine pounds of wool to the fleece; and those farmers who confine themselves to the Lincolnshire breed get ten pounds. Some authorities say eleven pounds are the true average weight of the fleeces of the true Lincolnshire breed. Let us increase our care of sheep, and omit to kill any

that so rotted will not need to he rotated by the fire, the heat of

<sup>\*</sup> The Lincolnslate breed is the heaviest in Great Britain in wool and flesh; and the new Leicester, or mixt Lincoln and Leicester breed, the next heaviest.

<sup>†</sup> Arthur Young, Thomas Stone, and Lord Sheffield, English writers on political economy, mention instances of Lincolnshire sheep, whose fleeces weighed 22 1-2 pounds, 23 pounds, and 30 pounds.

lambs or sheep under three years old, and we shall have more wool in the next year or two for our army, navy, militia, and camp followers, and all their attendants, than will be requisite for any war, with any power in Europe.

To the planters and farmers of the United States .- It is wonderful that the profits of sheep and wool have remained so long unobserved in the United States. This branch of farming particularly suits our country, because we have so great a quantity of land, and so moderate a population in proportion to our extensive territory. One man, boy, or woman can take care of many sheep. In Scotland, the least fertile country upon earth, that sagacious, steady, and energetic people, produce wool in their poorest counties, and sell it as low as 7s. 6d. and 8s. sterling, for a stone of 24 and 26 pounds.\* This is less than seven cents per pound! Of this wool coarse hats and bonnets, carpets, and stockings are made. Our poorest districts are all milder than Scotland, and more fertile than one half of its sheep districts. They are also much drier, which favours the health, flesh, and wool of sheep. With the extension of sheep, the extension of manufactures should, and will go hand in hand. Manufactures are one of the handmaids of Agriculture. Since beef, pork, and grain may be low, in the ensuing year, because our vessels are captured, let us use our beef, veal, and pork, and feed our poultry with our grain for our own tables, and spare our sheep for one or two years, and thus increase our stock of them. By girdling in all our lightly wooded lands, we may open the surface of the earth to the air and sun, and make good sheep pastures. The brush scythe will cut up brambles, briers, and underwood. The brush scythe or brush cutter, would be better always in our sheep keeper's hands, than the shepherd's crook and pipe.

We certainly ought, very considerably, to diminish our tobacco cultivation. Sugar lands are employing part of our southern

<sup>\*</sup> See Sir John Sinclair's books on Scotland and its parishes, in seventeen volumes; a work full of instruction to the farmers, freeholders, and planters.

labourers, who used to make tobacco, cotton, indigo, rice, and corn. Sheep will employ a number of hands, which were lately engaged in raising cotton, tobacco, hemp, indigo, rice and corn. The poorest and bleakest lands, in the northern states, may be brought into use for sheep, though too stony or too steep for the plough. By thus adopting new modes of agriculture, and new modes of industry, we shall give ourselves a complete self dependence, under a benign Providence.

It is a fact, (which Sinclair's Statistics of Scotland prove, and which Mr. Arthur Young's English farming books confirm) that our oak barrens and unwooded plains may be profitably applied to sheep. The streams, which fall from our hilly lands, could be made, by little channels, to water their sides and produce great quantities of grass, in poor, and stony, and broken grounds: a good employment for the industrious shepherd.

As manufactures should be ever in view to support the value of wood, sheep, and lands, the trade of dressing skins should be diffused through all the counties, in the morocco style, and for bookbinders, glovers, wool card makers, and others. A pound of leather gloves can be brought from the state of Tennessee, or Ohio, to Philadelphia, for a five cent piece. So of a pound or square yard of Merino superfine cloth.

The capacity of the United States in the production of sheep, and their great interest in the woolen manufacture.—In the whole of the counties of England (exclusive of Scotland) it is computed, that nearly twenty-nine millions of sheep are maintained! These produce (at five pounds coarse and fine, on an average, per head) one hundred and forty-five millions of pounds weight of wool\*, which brings there, the medium price of eleven pence sterling, or a little more, per pound. This is equal to about twenty cents and one half, much being coarse wool, for working

<sup>\*</sup> The Editor is enabled to state, from an accurate source, that "the gross produce of wool in Great Britain, during the 12 months preceding July, 1810, was 144,000,000 lbs." It is probable, that a difference of one million of pounds, in the produce of wool will take place, in two successive years.

England alone, for her unmanufactured wool, though her quantity of land is not more than half the joint contents of New-York and Pennsylvania, and is far less than the lands of Virginia, or of New England, or of Ohio, or of Georgia, or of the Mississippi Territory. Though so vast a quantity of wool was produced in England in 1809, yet Scotland and Ireland each produced much wool, and six millions of pounds of fine wool were imported into Britain from Spain. The British manufactures of wool were computed, for exportation, to be 8,500,000l. Similar woolen manufactures, for home use, were estimated at 17,060,000l. the two making the sum of 25,560,000l. sterling, or one hundred and thirteen millions, six hundred thousand dollars.

We can then easily and profitably discontinue most of our tobacco, and some of our cotton and beef cattle farming, for this immense object of agriculture, the produce of which is wanted in our home market, for our own use. We can manufacture it, in part, within our families, and in part within the houses for carding and spinning machinery, which we are every where erecting No spoliation will injure our home wool market, as is the case with our tobacco, our cotton, and our beef, and indeed all exports to foreign countries. Our poorest barrens, plains, and burnt lands, will serve for sheep walks, as in England, Wales, and Scotland; and so will our rich marshes, and our strong limestone and other fertile lands. Here, any quantity of land can be spared for sheep, without lessening the quantity we require to sow with grain, hemp, flax, and other productions. Wool is worth from 50 to 100 per cent. more here than in England; One man can tend many sheep, and he can farm in that way, a large quantity of our redundant land. Valuable sheep grounds, to a vast extent, can be purchased in America, for much less than the lowest average rent of the poorest county of England, Ireland, Scotland, or Wales. The sheep are fine in Arabia, fine in Spain, and fine in England, and will therefore thrive, in all our climates, from the Gulf of Mexico to the river of St. Croix.

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The American climates are all fit for sheep.—The goodness of Divine Providence has enabled the people of various climates to procure wool from their respective countries. Arabia is a hot country, and yet Arabia produces the fig, the cotton, the orange, and the coffee tree. On the other hand, there are many sheep in Iceland, Norway, the Shetland and Orkney Islands, the Hebrides, and all the bleakest counties of Scotland. They are numerous in Barbary. England, Spain, Portugal, France, Germany, Poland, Russia, Denmark, and Sweden, abound with all the varieties of sheep and wool. South America has fine wool. There can be no doubt therefore, from facts in the old world, and facts in the two Americas, that sheep and various wools can be raised with ease and great profit, throughout our country. This subject should be turned into every position, and considered from every point of view.

We want much fine wool, more good wool, but much more of coarse wool. Though the best English wool is worth two shillings and five pence sterling per pound, yet the quantity of heavy fleeged wool, at eight and one half to nine pence sterling per pound, is so great, that we learn, that the average price of English wool is little more than eleven pence sterling, or twenty cents and a half per pound. The same wool here, (fine and coarse,) would sell now from thirty to sixty cents by the pound a profit peculiar to the United States.

Heavy fleeced sheep.—It is stated in "Arthur Young's Survey of the county of Lincolnshire," that Mr. Graves, of that county, had a true Lincoln sheep, which clipped twenty-three pounds of wool the first year, and within half a pound of that weight, the second year, and was sold in the London market the following Christmas, weighing 40 lbs. the quarter.

This gentleman, (Mr. Graves) sold in 1796, no less than 3568 tods of wool, weighing each 28 pounds.

They feed often on oil cakes, often on turnips, and sometimes on a plant called the Sow thistle, which grows on rich lands. Nothing makes wool grow so fast as oil cake.

It is also stated, that the sheep around Boston, in Lincolnshire, (G. B.) yield, on an average, 14 pounds of wool per annum, fit for kerseys, blankets, carpets, shalloons, &c.

A lady of Spalding, in the same county, spun one pound of this wool into 168,000 yards, or 95 miles of yarn. The apprentices spin it to the length of 13,440 yards to the pound, or eight miles. Hence we may learn the profits this country can make on the long-wooled or heavy fleeced sheep, by combing the wool and making "warsted" stuffs, such as shalloons, durants, moreens, bombazetts, &c.

They use a machine to comb wool, called "a Big Ben."

The price of a fat Lincolnshire sheep, after the third shearing, is 38s. to 72s. sterling; or 8 dollars and 44 cents to 16 dollars for the sheep.

The Lincoln sheep are preferred to any other by the English Marsh Graziers, for hardiness and for profit.

The Leicester breed of sheep in England, yield in Lincolnshire 6 1-2 to 9 1-2 pounds of wool. It is finer than that of the Lincoln breed. The carcase is not so heavy; but so good lands are not required for this breed.

The Herefordshire (English) sheep yield very fine wool; but only 2 to 3 pounds to the fleece. The Merino sheep yield finer and much more wool; and our dry climate particularly well suits this valuable breed.

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Clothing for the Southern labourers.—The cotton manufacturers of the United States are earnestly advised to procure samples of the best and finest, undyed and unwhitened woolen article, made in England, called kendall cotton. But though so called, it is entirely of sheep's wool. It is often napt, which is unnecessary either for appearance or utility. This cloth is plain woven, or untwilled. It is presumed, when light, to weigh 12 or 13 ounces to the yard, of three-quarters wide. When stout and properly made, it will weigh 13, 14, or perhaps 15 ounces. It is advised, that the foreign article be nicely and closely examined, for the purpose of making a cotton substitute for it, of

about 14 ounces per yard, of 27 inches wide, unbleached and undyed, not napt, twilled above and below, made of chain not larger than No. 2, or of the size of small twine; with a looser or coarser filling. When done in this manner, it would weigh about 14 ounces; it would be firm, and warm for the clothing of the coloured labourers to the southward.

Those people have heretofore worn English kendall cloths, called kendall cottons, to the amount of millions of yards per annum. As we have a superabundance of cotton wool, the object is to make out a good substitute in the above manner. It can also be made with great ease in the southern families.

It is an additional advantage that this manufacture will do for the vest backs of the army, and of private persons, and for the round jackets and trowsers of the navy.

It may be dyed blue with logwood, or coarse indigo; or of a buff or cinnamon colour with iron liquor; or of the same colour, or olive brown, with bark and ley, or bark and copperas, by any farmer or planter, to avoid the trouble of too frequent washings.

In the countries on the Mediterranean sea, many of the women wear in winter a thick cotton cloth, something like what is proposed. From that fact, and from the common sense of the thing, we may presume, that an extensive use of such a new American kendall cotton cloth, would take place among the labouring females, in all parts of the United States. In France, elegant cotton swansdowns (called significantly Molleton) with purple borders, are made at Marseilles, for home consumption and the Mediterranean trade. There can be no doubt, that two or three millions of cotton wool could be consumed in common and fine kendalts.

# ENCOURAGEMENT TO WOOL GROWERS IN THE UNITED STATES.

"A GENTLEMAN who has just returned from Spain, whither he went last autumn, for the purpose of inspecting the flocks

often mapt, which is

From the appendix to Lord Sheffield's report on the present state of wool in Great Britain. London, September, 1811.

VOL. II.

and contracting for the fleeces, says, that if the country were immediately relieved from the destructive warfare in which it is at present plunged, many years must elapse before the flocks would recover their former state of perfection. There is now scarcely a fine flock in the country; and from the impossibility of obtaining the usual succession of pasture, and other causes, the fleeces are generally very much deteriorated in quality.

The sheep's wool imported into Great Britain, on an average of four years, ending the 5th January, 1811, was, 7,865,567 lbs. and the quantity imported in the half year, ending 5th July, 1811, distinguishing the countries whence imported, was as folwall next page shall be on agriculture I shall writt swol

Germany and the North of Europe, 12 11594 lbs.
elimites 189,278 hanges, from heat to cold, and garage To
Spain and Gibraltar, mo. doum .os gri 2,147,696 r os ye.
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and white and Total, well wash the Total, tell wash the all two as 140,676 white

from stagmant water and insects, as in general is. In ited with It is believed, that wool has never been exported from the United States, since the independence of the country, before the last or present year; but it is to be hoped, that our manufacturers will be enabled to give prices sufficiently encouraging to the wool growers, to enable them to dispose of the article at tore up the soil in winter, allowed in the two two emandi

Independently of the profit arising from the sale of wool, the increased value of the sheep pelts, is an object of great importance. When dressed, they now bring thrice what they did three or four years since. Having lately come to the knowledge of this fact, the Editor was induced to inquire into the cause, and this he soon learnt to be the immense demand for the skins in the

morocco manufactories in Philadelphia. The demand from the manufacturers will continue to increase in proportion to our population, to the influence of fashion, and the multiplied wants of a people rapidly increasing in wealth. The other uses to which dressed sheep skins are applied, are also numerous, and the number greatly augmented. Hence it is apparent, that there is every encouragement to the farmer to multiply his stock of sheep.\*

EXTRACT OF A LETTER FROM MR. A. BLAIKIE, OF ROXBURGH COUNTY, SCOTLAND, TO JOHN LANG, PHILADELPHIA.

"MY next page shall be on agriculture. I shall write from experience. I am at a loss as to the nature of your soils and climates; your changes from heat to cold, and cold to heat, being so rapid, differing so much from ours, must render our system and yours very opposite. As to shell marl, when it can be had, it is certainly the best of all kinds of manures upon dry or sandy soils, or where the ground is wet; but upon a clay retentive bottom, it has much less effect. Shell marl is only found in moss or swamps; the turf or peat-moss on the top, is sometimes three to five or six feet deep, then the seam or stratum of marl from three to eight or ten feet deep. It is of a greasy nature, and when broke in water will wash cloaths. It has all been bred from stagnant water and insects, as in general it is mixed with small shells, resembling snail caps. In Britain, wherever it is found, there is always a strong hard rock across the outlet of the last or present year; but it is to be hoped, that outique god

In five years past, I have brought in and improved 300 acres on one farm by marl, which lay within the farm. I ploughed or tore up the soil in winter, allowed it to rest for two years, then tross-ploughed and fallowed it in the summer, by perhaps three ploughings; then laid on 40 cart-loads of marl per acre, each

For a view of the skin trade, see Vol. 1, p. 244.

<sup>†</sup> The strong tough sward of old pasture ground in Scotland, is unknown in the United States. In Pennsylvania, one ploughing in the fall, and crop ploughing next spring, would be a sufficient preparation.

J. I.

cart-load about 20 Winchester bushels; harrowed well, then ridged up the ground before winter, and sowed it with oats in the spring.

The first crop is often not good; but when the marl is fairly incorporated with the soil, we can count upon the crop. We never take two white crops\* in succession; always a green and white, or fallow and white, or turnip and white; always sowing with grass seeds with the white crops after fallow, &c. allowing it to rest in pasture for two or more years: we generally take a crop of hay the first year.

Where your land has been often cropped, by giving it a ploughing after harvest, then ploughing again in May and June, laying on the marl, dressing also with a little dung, and taking a crop of turnips, and the spring following sowing grass seeds with the crop, you would see a wonderful change in the soils, for pasture and the following crops.

Very few have done more with marl than myself, first and last, since I came to this farm, 53 years ago. I have dressed at least 800 acres with marl; I had it always at a moderate distance, where I could average eight returns to the pit per day.

I have sent you a fair sample of this excellent manure, that you may compare it with any other you find. Take a little vine-gar in a wine glass, half full or so, put a piece of marl into it about the size of a plumb, and you will see a fermentation instantly, with a noise. By this means you may prove any kind of sloughy substance from any bog, pit, or swamp; if it ferments in vinegar it is a precious manure, if not, have no dependence upon it. Marl is rather of a cooling nature, and when laid upon sandy dry soils, the change it makes is wonderful; but on a wet clay soil, it has less effect. Lime has a more immediate effect, but does not last so long. There is in some places in Scotland, a kind of rock marl, got out of the banks of rivers, but that is now laid aside. Shell marl produces both stronger and

<sup>\*</sup> By white crops is meant grain crops, viz. wheat, oats, or barley. Rye is never, or very rarely cultivated.

finer grain than any thing I know, save well made dung, which soon wastes itself.—Sir John Sinclair, president of the board of agriculture in Scotland, is just now publishing a book, in three volumes, which will be of great utility in every part of the world where corn (grain) is raised. He has got reports from experienced farmers in every part of Scotland, of what they have done; their observations, &c. upon every branch of the farming line; method of labour; rotations in cropping; different seeds on different soils; and in short, on every question you can put; and these he selects and arranges so as to complete the work under different heads. It will be a most useful work. I have the honour to be one of his correspondents. The book when published, which will be in a few months, will be a most valuable acquisition to American agriculturalists, as well as to British.

In speaking of acres of land, there may be some difference in different countries: our acre we count by in the south of Scotland, is the English acre, 10 chains long by one chain broad, the chain 22 yards long, 4840 square yards. The Scots acre is one-fifth more."

# ON HEMP.

THE cultivation of hemp was carried on with spirit for the last three years, in the Western States, particularly in Kentucky and Ohio, and great quantities have also been raised in Pennsylvania, and New York. From Kentucky much of it came to Philadelphia, by land and by water, in the form of spun yarn. In both forms it paid well. The hemp brought from \$12 to 14 per cwt. and the yarn sold for 16 cents per pound.

The seed brought from \$7 to 8 per bushel; at present, the price of hemp has fallen considerably, owing to the diminution of our commerce. Hemp is now only \$6 per cwt. and seed sells slowly at \$1 per bushel.\* At such prices, the raiser of hemp in Kentucky will loose by sending his hemp to the Atlantic States.†

<sup>\*</sup> Spun yarn sells at 10 cents per lb.

<sup>†</sup> The following account of the different charges attending the conveyance

ideing thus pre-

But THE PRESENT TIMES CANNOT LAST MUCH LONGER; and when commerce uncramped, shall again unfurl her sails, hemp will amply repay the cultivator. evisee or , is we are able of

Although it had been long known, that hemp was raised in this state, particularly in Lancaster and Chester counties, yet the majority of farmers paid no attention to it. The great dependance for a supply of the article was on Russia, from which we la preparing the hemp for braking, the permission betrodmi

umoniy called "dew roting" still ,4081inl to a	4480 tons
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Total, 22,640 tons.

Besides cordage and sail cloth, which together, have cost this country between one and two millions annually; and were paid for in cash, or by bills on London, or the continent, as Russia does not stand in need of any of our raw materials or manufactures. It being now evident that the United States are able to raise all the hemp and much more than is required for home use, it is to be hoped that such protection will be immediately given to its cultivation, as the importance of the article demands. This subject engaged the attention of the committee of commerce and manufactures, during the last session of Congress, and has been re-

of hemp from Lexington, to Philadelphia, was given in the "Lexington Reporter" of February last:

Cost of	112 lbs. merchant	table hemp in L	exington,	eive, an	85 00 1
Packing	gy (say) it erest e	d vem if. 10.	auchor-w	by 45 de	bar 50 arq
Hauling	to Limestone, at	1.2 cent per lb.			
	to Pittsburg, at		11.	die hen	to Tuolos
	and porterage at			di ,grasi	
Hauling	to Philadelphia,	at 3 cents per l	be leblos	VYSV 30	n 23 36 aw
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richasse facer	it. will amount to	nimeroe and ma	65 To 35/1/10	the cum	the 08 vy. to
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cently brought to their recollection by petitions from New Jer-

In order however, to deserve public encouragement, the farmers ought to prepare their hemp in the best manner, that is, by a careful water-rotting, instead of the old practice of dew-rotting. The observations on this subject by the secretary of the navy, are so just, that they deserve the utmost publicity.\*

"In preparing the hemp for braking, the pernicious practice of what is commonly called "dew-rotting," still prevails to a great extent—a practice tedious in its process—partial and unequal in its effects upon the fibre—and destructive of considerable quantities of hemp by the unavoidable exposure of it to the winds, which blow it about and entangle it. Hemp thus prepared, is in some places strong, in others weak, and has moreover a dark colour; all of which materially affect its value.

"In hemp there is a viscous gummy substance, by which the fibres of the bark are bound together, and to the body of the plant; and all that is necessary to prepare it for breaking is to dissolve this substance. The experience of other nations has long since decided, that this dissolution can best be effected by immersing or steeping the plant in clear running water,† which, in a much shorter period of time than any other system heretofore practised, produces this dissolution over all parts of the plant equally—makes it equally strong in all places—renders it more flexible—gives it a lively bright colour—and, what is an object of vast importance, especially as respects durability under water, it will receive and retain a greater portion of tar—than when prepared by "dew-rotting." It may be here further remarked, that the more clear and pure the water, the brighter will be the colour of the hemp.

"In Russia, three weeks are allowed for steeping, where the water is not very cold; but if cold, as in rivers and springs, five,

rage in Philadelphia,

<sup>\*</sup> These observations are a part of a communication from the secretary of the navy, to the committee of commerce and manufactures, at the last session of Congress.

Running water is now said to impede the process of rotting.

and sometimes six weeks, are found to be necessary. To ascertain whether the hemp be sufficiently steeped, a head is taken out of the pond, dried and beat, and if the husk comes off, the hemp is considered as having been sufficiently steeped."

Repeated comparisons of American water-rotted hemp, with the hemp of Russia, by manufacturers, prove that it is only owing to "dew-rotting," and careless preparation, that the home growth of the article is inferior to the imported.

#### CULTURE.

Soil.—Hemp will grow upon any soils capable of being reduced to a good tilth, and that have been well manured, but it thrives particularly well in deep rich moist soils, especially such as are formed by the overflowings of rivers. Bog meadows, when properly prepared, are also peculiarly adapted to its growth, and they may be sown for several years in succession with it. The hemp, from such soils, is of the first quality, that is, large and strong.

Preparation.—All who have cultivated hemp, agree in the great importance of ploughing the land in the autumn, say once in September, or early in October, and left as rough as possible, to be mellowed by the winter frosts: in the spring, as early as convenient, the ploughing should be repeated and the land harrowed, until the soil becomes light and mellow. Unless the land be rich, manure must be freely applied if a good crop be expected.

Seed.—The seed when sown, must be immediately well harrowed in, on a very even surface, so that they may be all covered at a uniform depth, and thus insure regularity in ripening, and a plentiful crop. The seed must be of the preceding year's growth: three bushels may be sown upon strong land; and two upon middling soils.

Pulling.—In August, when the farina passes off, and the male hemp turns whitish; the business of pulling must then commence, by making alleys through the field, and selecting the male from the female or seed hemp, which is to be left a month longer to ripen, (if seed be the object.) The male hemp may be then

bound in small bundles with rye straw, and left in the field a few days to dry; or it may be spread on the ground where it grew, and after lying two or three days, turned with a pole: after two more days' exposure, it is to be bound in bundles of 18 inches circumference, and if perfectly dry, put under cover until convenient to put it into the water.

The seed hemp is to be pulled as soon as the seed begins to fall from the stalk, and to be bundled and carried immediately to the place where it is to be threshed, there to be set up in the sun a few days, and then gently threshed; and again put in the sun a few days more, and afterwards threshed again—It is then to be treated as before directed for the male hemp.

Water-rotting.—Clear standing soft water is the most suitable for this purpose. If a stream runs through the farm, a dam may be erected, so as to obtain four or five feet water,\* in which the hemp may be laid, taking care to lay the bottom (if muddy) with straw, and also to cover the hemp therewith, to keep it clean: plank and stones must then be placed upon the hemp, the damgate being shut down, and the hemp overflowed, it is to remain till the rotting is finished. This process will be completed in six or seven days, if the hemp is put in about the latter end of August, (according to Mr. Read, of Roxbury); but if put in at the latter end of September or in October, it may remain 12 days; if the latter end of October or November, 20 days: but attention must be paid to the weather, as when it is warm, the hemp will rot much sooner than when it is cool.

Mr. Read further says, "My practice has been to draw the water from the hemp 24 hours before the taking it up, leaving the weight thereon in order that it may be well drained, as in that case it is much better handled; then it is removed to a dry piece of ground, and spread about two inches thick, and after remaining a week or ten days in that situation, is turned; and in eight or ten days after, it is taken up, tyed into bundles and re-

<sup>\*</sup> The depth of the water is of no consequence, provided it can be drained off intirely when requisite.

moved into the barn, where it remains till I have leisure time to brake and swingle it. When barn room cannot be spared, I have placed it up against a rail fence, running the top ends between the two uppermost rails, letting it remain there until proper time for brakeing; for which purpose I have always found clear cold weather to be the best.

"Female hemp requires a few days longer to rot than the male, owing to the greater thickness of the bark or harle, and the greater quantity of the glutinous substance, occasioned by its longer standing.

"My hemp is broke and swingled much in the same manner as flax, excepting that the first brakeing is done in a coarse brake, the teeth or flats being nearly four inches apart; then a common flax brake answers well, and being carefully swingled, is fit for use."\*

The dressing and spinning of hemp, are best carried on in a damp place.

Hemp intended to be prepared for making into fine cloth, should be pulled before it is ripe, and then steeped immediately, because the rotting takes place more speedily while the hemp is yet green. Even if intended for cordage, the sooner it is rotted after being pulled, the better; as it will be strong, and have a greenish cast, which is much approved of by manufacturers. It is necessary to pick the hemp plants over at several different periods, in order to avoid having any bad stems among the good, which might spoil a whole parcel, if intended for linen.

Produce.—The produce of hemp varies from 6 to 12 cwt. per acre. Mr. Curwen, of Merion, Montgomery county, sowed on the 6th May, 1788, two bushels upon upland, which had been limed two years before, and being afterwards dunged, grew pumkins and cabbages: the clear profit was \$30.27, which is per acre \$60.53; "a profit, he remarks, sufficient to induce us to cultivate it with spirit, especially as a crop of wheat may follow with great prospect of success."

<sup>\*</sup> Communicated to the Massachusetts Agricultural Society, 1789.

The following is the statement of the expense and produce:

## Expense.

and the second s			
To two ploughings,	THUE	£.0	70
		. 1	
Harrowing and sowing, .	•	. 0	20
Two bushels of seed,	21/1/1	. 2	5 0
Pulling the male hemp, .		. 0	15 0
Ditto female, spreading, &c	10 2	. 0	15 0
Brakeing,		. 1	10 0
management of the response has		da ere	MV IV
Total expense,	o nad Came	· £.6	13 0
Produce from the br	ake.	ett Werth	bake
By 360 lb. at 6d. per pound,* .		f. 9	00
8 bushels seed, at 22s. 6d	. 11		00
		£. 18	00
Expense deducted,	i indi		13 0
Clear profit,	e l	6.11	70

From the Edinburgh Farmer's Magazine, for June, 1810.

## OBSERVATIONS ON THE SUMMARY STEPS, WHICH LED TO THE LATE IMPROVEMENTS IN SCOTS AGRICULTURE.

Read in the Agricultural Society of Edinburgh. By William Tennant, L. L. D.

[The following paper, although written with a view of tracing the progress of a European country from barbarism and sterility, to a high state of agricultural improvement, may furnish

<sup>\*</sup> The present price, 1811. Editor.

<sup>†</sup> Author of "Indian Recreations." a work in which the Agriculture of India is greatly elucidated.

much matter for useful reflection to the American farmer. The ancient husbandry of Scotland, as described by Dr. Tennant, was nearly similar to that which formerly prevailed within the memory of most farmers of 50 years of age, in many parts of the United States; and some resemblance to it may be seen at the present day. How do the cattle look in the spring, in those states in which the blooming clover, the towering timothy, orchard and oat grasses, are as yet strangers, and where the name of green grass is not yet known? How extensive is the district, in which the old Scotch divisions of infield and outfield are preserved, and the practice still followed of exhausting the earth by repeated white (grain) crops, until absolute sterility is produced? How few farmers think of raising more turnips than will supply their family; or are aware of their beneficial effects on the soil, and on cattle in winter, especially the breeding stock, by correcting the costive effects of dry hay and straw, and by increasing the flow of milk?—But a long list of questions in reference to the defects of the agriculture of the United States, might be asked, were the present the proper place. Some of these defects have already been pointed out, and more shall be noticed in the future pages of this work. Editor.]

AGRICULTURE, like the other arts, has had its periods of decay and renovation; it has experienced, (as well as learning in general) its dark ages, and seasons of illumination. During a period, extending through several centuries, prior to the union of the two kingdoms, into which this island was then divided, the agriculture of Scotland seems to have remained, not merely in a backward and unpromising state, but in a condition almost entirely stationary.

England, from its extent, situation, and fertility, might be deemed the more powerful community; Scotland, possessed of a poorer and more inaccessible territory, contained, perhaps, a more hardy and warlike population. Hence, in the long contested struggles between the states, the object of the latter was chiefly independence; that of England, was more commonly an

aim at power, and the love of conquest. In all such contests, however, the weaker party must necessarily suffer most; hence our native country, notwithstanding all its hardihood, and the unquestionable bravery of its inhabitants, was constantly kept in a state of harassment and alarm; not unfrequently she was plundered, and on some occasions, almost entirely subdued.

During this long and calamitous period, the actual state of Scotish husbandry bore, and in some parts still bears, the most ample testimony to the truth and exactness of this general representation of the circumstances of the people and condition of the kingdom. The soil, long neglected, and naturally poor, afforded but a scanty fund of provision, either for man or for cattle. Notwithstanding the exaggerations of its historians, it probably never contained, at the period alluded to, one million of inhabitants; and this small population, though bred in the most abstemious and frugal habits, could, in some seasons, with the utmost difficulty be kept from starving. Several severe famines are actually recorded in its history; and hardly a single century has elapsed, but many hundreds of the inhabitants died of absolute want.

If such was the state of the human species in North Britain, that of its cattle and other live stock, during the winter months, was still more distressing. No regular supply of winter food being then provided by the agricultural system, a protracted and severe winter carried off, not unfrequently, one-third, sometimes one-half, of all the live stock in a whole district. Young persons, who cannot remember the introduction of what has been termed artificial grasses, must have considerable difficulty in conceiving those scenes of misery and starvation that actually passed before the eyes of their forefathers.

Till the middle of last century, a period of less than sixty years, the whole arable surface of the kingdom was divided, not by fences or hedges, which were then unknown, but by the system of management, into *infield* and *outfield*. The first of these portions was generally sown for three successive years with oats, then almost the only bread-corn raised in the country. After this

scourging and destructive rotation of crops, the land was laid down for pasture, or to rest, as it was termed, without receiving the smallest particle of manure, either calcareous or putrescent. Thus reduced to a state of absolute sterility, or caput mortuum, the soil continued for years, incapable of covering its own surface with the most coarse and scanty herbage, till it again was broken up to undergo a similar routine of scourging cultivation; concerning which, nothing appears so remarkable, as that it could ever defray the expense of seed, or the labour of the farmer. The culture of what was called the croft-lands, was subjected to a management equally unskilful and slovenly; and the result must have proved nearly as unprofitable. The quantity of manure, from the scarcity of winter food, was necessarily very small, and was almost invariably spread over a few acres adjoining the farm-house, for the purpose of raising an inferior kind of barley (brown bear), the hordeum tetrasticum of Linnæus. From this management, a small portion of land in the vicinity of the farm-steading, gradually became deeper, and of a more fertile quality: but it can hardly be necessary to observe, that no adequate advantage could possibly be derived, either from the culture or manure bestowed on this spot; since it is notorious, that, before either a fallow or a green crop was known, the grain must have been choked with quicks, and annual weeds, to the very great detriment, as well as the diminution of the produce.

Such was the unpromising, and almost hopeless condition of Scotish agriculture during a long succession of years;—a period, during which the energies of Scotsmen were either wasted in war, or their faculties were benumbed, and rendered torpid, by the all-powerful influence of prejudice, ignorance and sloth. Posterity will scarcely believe, that, in the short period of fifty or sixty years, their minds should have been so much enlightened, and their industry so greatly improved, as to enable them to occupy the first ranks, not only among the agriculturalists of Britain, but to contend for the palm of eminence in husbandry, both theoretical and practical, among the most improved nations at present in the world.

I. In enumerating the steps which have led to this improved state of our agriculture, the application of lime, and the other calcareous manures, has generally been reckoned the first stage of the progress. The introduction of this manure is perhaps a fortuitous incident:—its origin as a general practice, is not at least well ascertained. Lime seems to have been known to the ancients; yet its use may be regarded as the grand circumstance which first shook the foundation, and finally overturned the ancient system of husbandry in Britain, after it had remained two thousand years.

Although calcareous substances are found in almost every corner of this island, yet their general application to the purposes of agriculture is not to be traced much beyond seventy years; at least the use of lime at that period was not carried to the one thousandth part of the extent which it is at present. Through all the best cultivated parts of North and South Britain, many individuals are still alive, who either remember its first introduction, or the time when its application was rare, and of triffing extent. It has been, indeed, rather the consequences of this great discovery, than the thing itself, which have brought on those great and beneficial changes in husbandry which we are here contemplating; for its earliest application was hardly ever free from manifold abuses.

It is the property of calcareous substances to act very powerfully in dissolving such vegetable or animal substances as are deprived of life. Under the action of lime, vegetable matter in particular is speedily dissolved; but, if it be either used in excess, or if the land be too severely cropped, without allowing a necessary restorative of putrescent manure, every one knows that the soil is soon exhausted, and rendered incapable of supporting any kind of vegetation. Hence, after the use of this manure, there arose a greater necessity than ever of invigorating the soil, either by pasturage, or by putrescent manure.

Scotish farmers, therefore, when they found themselves in possession of this great and powerful instrument of fertilization, either from ignorance, or too eager a desire to become rich, al-

most uniformly abused it. Their capital was but scanty; yet, as soon as it enabled them, they limed almost their whole surface. Their eagerness to reimburse this expenditure, or rather all-powerful necessity, suspended the exercise of both judgment and discretion. They continued to plough and crop their limed lands, till they brought them to absolute sterility. Of this great and almost universal error, neither Scotish nor English husbandmen can be pronounced free. The extent and enormity of this error, rather than the exercise of a sound discretion, paved the way, in both countries, for the next great improvement in British husbandry. This consisted,

II. Of a diminution of the extent of land retained under cultivation. This step brought along with it several other advantages of considerable value. It implied a diminution of the expenses of seed; while the crops were so much amended by it, that they equalled, and sometimes far exceeded their former amount, though now raised on a smaller surface. It implied also a diminution of rent, in proportion to the smaller number of acres retained under the plough. And in the last place, this improvement reduced the quantity of labour required in cultivation, and thereby abridged its expense, which has always proved a heavy item in the charges of every cultivator. The silent operation of these savings, and of this procedure, though apparently minute, and certainly unostentatious, has been very sensibly felt over the whole of Britain, and particularly in Scotland. Its influence has been universal, and so uniformly salutary, that we cannot hesitate to rank it among the most important changes in the whole history of Scotish agriculture.

III. The peculiar praise of this practice, however, is derived from its having given rise to a third most important change in favour of Caledonian husbandry, namely, an immense reduction in the number of working cattle. Throughout the whole of Britain, the number of draught cattle has been always extravagant; in many instances, their expense has eaten up the greater part of the cultivator's profits; and, in not a few, it has ruined his prospects, and destroyed his exertions, by far exceeding these profits.

Those men, therefore, who diminished the surface under cultivation to the smallest number compatible with good husbandry,—who introduced the small plough,—and improved the horses, so that two, instead of four, are sufficient for its draught, have been the greatest benefactors to whom Scotish husbandry ever stood indebted. Even at the present moment, forty years after the introduction of Small's, Gardener's, or the Rotherham plough, the contrast is great between the practice of the Northern and Southern divisions of our island, in regard to this most important article,—the economy of the team. The writer of this article has frequently seen, in the south of England, five large horses yoked at length in the easiest of all operations, the planting of potatoes; although, in this simple and facile process, it may easily be demonstrated, that a loss of 100 per cent. is incurred in the article of labour alone.

This remark, implying so heavy a charge against the economy of English husbandry, is applicable, in a greater or less degree, to the whole kingdom; and is at least equally glaring regarding the waggon team as that of the plough. There is nothing in the whole system of English husbandry resembling, in efficiency and economy, the Scotish cart and small plough;—a circumstance which places its rural economy in a light incontrovertibly superior; and this single advantage has given it a decided preference in the opinion of every competent judge throughout the whole island.

IV. The next great improvement, which produced something like a revolution in Scotish husbandry, was the introduction of the artificial grasses. This was gradually effected nearly at the same time with the other changes already noticed; and it appears peculiarly remarkable on the subject of agriculture, that few of its improvements are ever introduced singly: each step is conducive to the introduction of several others, perhaps still more important and valuable in the general system. It has been said, that no nation can ever borrow any improvement from its neighbours, till it be in a state fit to invent it: and it is equally certain, that the inventive powers are no sooner awakened in a country

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to one object, than they acquire strength, and are exercised in almost every direction.

On several parts of the continent, and particularly in Holland. many species of the gramina had been already cultivated; and as Scotland was now ripe for their culture, they did not long escape the vigilance of our farmers. Ray-grass, Lolium perenne, red and white clovers, Trifolium pratense, and T. repens, were found to be the most hardy and nutritive, and therefore the plants best suited to a cold climate, and an infertile soil. The liberal ideas and persevering industry of our farmers, cannot, perhaps, be better illustrated, than by their spirited and early cultivation of these articles. In truth, a new era in agriculture has been introduced by their judicious and persevering efforts. Winter food, and the consequent value of live stock, has in fact been increased more than two-fold; while its quality is infinitely superior to whatever was formerly enjoyed, or even expected by the country at large. The result has been, that the number of live stock has not merely been increased, but its value has been nearly trebled during that comparatively short period.

The practice now under review, is not merely valuable in itself, but has spread its beneficial influence over almost every branch of husbandry. It has supplied what has always been regarded as the greatest desideratum among farmers,—a double, perhaps a treble quantity of putrescent manure; and, without any extravagant exaggeration, it may be said to have added a second productive season to the year. Even during the severest winter, a part of our fields are now covered with the richest verdure; and since the introduction of the turnip husbandry, no inconsiderable portion of them is loaded with the heaviest and most profitable crops.

Formerly, it was during the summer months only, that a few cattle were fed for the butcher; and the whole provision for the year was laid in during the months of harvest and autumn. Of late, however, no season of the year is without its appropriate supply: the winter and spring months, once remarkable for sterility or want, are new the most productive of supplies for the

butcher-market, the demands of which, during the last fifty years, have increased nearly tenfold.

V. These beneficial results have, generally speaking, flowed from the introduction of cultivated herbage; but they are more peculiarly to be ascribed to the general and successful adoption of the turnip husbandry.

On the first introduction of turnips, the English farmers remark, that they were universally sown broad-cast, and hoed by men-servants, at great expense. The present mode of drilling them was introduced into Northumberland from the south of Scotland, about the year 1780; and the advantages of this mode have so far recommended it, that few are now sown broad-cast in that county.\*

VI. The introduction of the threshing-mill, is the next improvement which I shall notice:—It is an invention confessedly of Scotish origin; and, if we take into view the rapid advance in the price of labour, it must be regarded as a step in the advancement of husbandry of very great importance. Mr. Marshall not only ascribes its origin to Scotland, but "declares it to be the most valuable implement of husbandry which has been discovered for ages past; and that every particular regarding its invention will be eagerly sought after for ages to come."

Mr. Meikle was the first person who constructed a threshing-machine of perfect utility. For this he took out a patent for England only, and in his own name.

This well authenticated fact seems at last perfectly established, that there is hardly a single farmer of any note, who has not been in the constant use of a machine for threshing his crop, in full repair, and of most perfect efficiency.

VII. Leases. According to our ideas, no expensive or solid improvement can ever be undertaken, under a tenure so precarious as to afford no hope of retaining the farm a sufficient time to reimburse the expenditure. To us, it seems altogether un-

<sup>\*</sup> Turnips form one of the regular crops on every well cultivated farm in Britain.

fair to bind a tenant to execute certain improvements on his farm, and to deny him, at the same time, that length of duration and security in his possession, which alone can indemnify and repay him.

In Scotland, a happy medium has been devised in respect of tenures. Leases are granted sufficiently long to indemnify the tenant; yet sufficiently limited to admit of the proprietor's reletting, at full value, his property.

VII. There still remains one advantge more on the side of the Scotish farmer, which he possesses over his southern neighbours, and which has perhaps contributed materially to his present envied superiority, equally to any quality that has yet been mentioned. This is, his general habits of economy; and particularly in the cheapness of the articles of his diet and personal expenses. It is from the hope chiefly of introducing this economy of living, that Scotsmen are at present so generally preferred as land-stewards and operative labourers in almost every part of England and Wales. The waste committed by the agricultural labourers, on many of the larger estates in England, is immense; and its expense hangs on the proprietors, and bears them down, something like a mill-stone tied to their necks. With them, frequently, all is either confusion, waste, or want; hence, to save themselves from sinking in this ocean of expense, they now generally cast a wishful and anxious eye towards Scotland; whence, if they can obtain a faithful steward, they imagine that they have done all that is possible in order to escape ruin, and to effect their salvation.

### ON FIORIN GRASS.\*

From the British Review.

(With a plate.)

"FIORIN is the grass which botanists have distinguished by the name of Agrostis Stolonifera: some, it is true, deny their identity; but it is only those, who having overlooked or con-

\* By Dr. Richardson.

demned this Agrostis as useless, are ashamed to retract; and defend themselves by asserting Fiorin and Agrostis Stolonifera, to be different grasses.

"The pure (or culmiferous) gramina, are those which we generally cultivate.

"There is another description of grasses, called by botanists stoloniferous, endowed by nature with a third sort of produce in addition to the seeds and stalks. This tribe, at their respective periods, emit long strings or runners, called stolones, which, creeping along the ground, when unsupported take root at their joints, thus forming new plants. The stolones of the Fiorin are very numerous, and attain a great length: Wray tells us twenty-four feet;\* but I must confess mine have rarely past ten. In these stolones the whole value of the Fiorin crop consists; it is therefore (as in the former case) the period of their greatest perfection we must look to for the time of severing.

"Here we are not, as with other grasses, limited to a certain point, in the approach to which they improve, and when they pass it, fall off; the quality of the stolones is at all periods equal; we have to look to the quantity alone; and that depends upon the length of the strings composing the crop. From the comparative view of the natural history of the stoloniferous and culmiferous tribes of grasses, it is plain that no reasoning from analogy will apply from one to the other, either in their cultivation or in the management of their crops; for no likeness whatsoever exists between them."

Doctor R. then proceeds to state, that the stolones continue vegetating till Christmas; which is consequently the time at which the crop of grass is in the greatest quantity; that they continue perfectly sound, fresh, and sweet, if left uncut on the ground through the whole winter. Unlike the common grasses, which, when cut for hay, require that their aqueous juices should be

<sup>\*</sup> Camden, in his Britannia, mentions the grass of the Orcheston meadow, which grew, as he says, to the length of 24 feet; he calls the grass, trailing dog's grass, and asserts that hogs were fed with it. It is, in fact, pure Fiorin.

evaporated in order to prevent fermentation: "The saccharine juices of the Fiorin are less volatile, and their cohesion preserved by the principle of life pervading for months every inch of the string," whether the crop be left cut on the ground, or gathered in stacks. So that the stolones, though apparently dry for months, will immediately vegetate if cut in small pieces, or placed whole in the earth. The quantity of produce from a field of Fiorin in full vigour, is enormous, (as we shall see under a future head), at least thrice that of an average crop of other grasses. This part of the account is strongly corroborated by the description of the Orcheston meadow,\* given in the transactions of the Bath Agricultural Society. In this meadow, by what was supposed to be some singular chance, Fiorin seems for many years past to have obtained spontaneously, exclusive presession of the surface.

We are obliged to Dr. R. for some curious facts, illustrative of the nature of this grass, drawn from its easy endurance of privations fatal to other grasses. These facts also lead to the practical purpose of ascertaining the spots where Fiorin is generally to be found growing spontaneously.

The first of these privations is that of sufficient soil for the roots, "which leads us to the paved or gravelled high roads, that by means of new cuts cease to be used. We find on these, not-withstanding the scanty covering, that the Fiorin has always taken possession; and when such roads become green, (as they invariably do when no longer travelled upon) Fiorin is the exclusive, or at least the predominant grass. The sides, even, of all our common roads abound with it, when the gravel extends beyond the part travelled on and beaten: in this shallow, hungry, but undisturbed stripe, it soon establishes itself."

An observation of a similar nature was made by Mr. Price, (see Bath Agricultural Society Report, vol. viii. p. 41) on the grass of the Orcheston meadow. It scarcely penetrates an inch below the surface, and the root takes such slight hold of the ground that a great length may be severed from it merely by

<sup>\*</sup> This meadow is in Wiltshire, and is the property of Lord Rivers.

taking hold of the pannicle or top of the culm. Upon examining the soil in various parts of the field, Mr. Price found that the grass was most luxuriant, i. e. there was a more exclusive growth of Fiorin, where the soil was most shallow. In all parts, flints are found within a few inches of the surface, and prevent other grasses from thriving; but in the most flourishing part, there was scarcely more than an inch and half of earth above a compact bed of flints. These facts, combined with Dr. Richardson's observations, seem to account very satisfactorily for the mode in which the Orcheston meadow has been spontaneously covered with a growth of Fiorin.

The second privation is that of the sun's rays. "This leads us to the north side of the walls, where the green sod comes close up to its foot. Here Fiorin is uniformly found, showing itself more and more as we approach the wall, and at the contact of the sod and wall it is nearly the only grass." The north side of a church comes of course under this description. Mr. Dickenson, member for Somersetshire, found Fiorin roots under the north wall of his parish church, and enclosed them to Dr. Richardson.

We shall now state but one other fact, in which this curious grass differs from all other vegetable productions of the same similar genera: Mr. Farish states, that "It comes into ear and produces pannicles bearing seed, which come to maturity before the winter; and the slender stalk which supports the pannicle from the stem appears white and dead, so that vegetation with respect to these is at an end. Nevertheless the stem itself, with the various branches or stolones depending thereon, continues to advance, increasing considerably in length from month to month, and adding uncommonly to the quantity of the crop. This quality we reckon peculiar to the Fiorin, as we know of no other vegetable that ever increases in length after the seed is ripe." (Treatise, page 32.)

Such is the natural history and description of the Fiorin grass; the main difference between which, and all other grasses, evidently resides in its active principle of life, not to be subdued by

those laws and operations of nature, which usually set bounds to the existence and increase of other vegetables; and under all the circumstances, we are only surprised that the face of these islands has not been long ago one wide waste of Fiorin. We proceed

2. To its useful Properties and Mode of Culture.

It is stated, upon "irresistible evidence," that Fiorin is more grateful to cattle of all descriptions, (particularly to those giving milk,) in every stage of its growth, than any other grass; that although it was first known to thrive luxuriantly in moist situations only, yet the uncommon duration and severity of our late drought (1809) "disclosed a new and unexpected quality of this strange plant; viz. that however dry the soil may become, its verdure and luxuriance remained unimpaired."

With respect to these last spots, Dr. R.'s evidence is certainly strong, and it may be said with truth, that "he does not dread the extreme of submersion in water at any time, be the crop standing or cut. Sufficient opportunities for mowing and carrying off are all that he requires." So true is this, that on November 15, he steeped part of his crop in a pond for thirteen days, placing it afterwards in separate cocks among the rest. The whole was then made into hay, and "all distinction between the two hays was lost."

It follows from what has been stated, not only, that the most eligible time for cutting and making this grass into hay is about Christmas, but that it is perfectly feasible so to cut and make it, notwithstanding the weather which usually occurs at that period. It is also evident, that if green food for cattle, particularly those in milk, be an object of interest to the farmer throughout the whole winter, the grass will retain all its perfection and nourishment, and may be cut in small quantities, as wanted. Nor is it by any means necessary that Fiorin should be eaten the day it is cut. The Doctor, by the advice of Sir Joseph Banks, permitted his to remain on the ground some days, and found it not deteriorated. "The juices are not volatile, nor is the sward disposed to ferment and heat." The produce is enormous in quan-

tity. "The right honourable Isaac Corry attended, and saw the crop from the water meadows at Clonfecle fairly weighed, amounting to eight tons, five cwt. and half, and twenty-four pounds the English acre; and this Mr. Corry confirms under his own hand." The Orcheston meadow contains two acres and a half, and is mowed twice. Twelve loads is the average of the first crop, six of the second; which about tallies with the abovementioned produce, supposing that the whole crop were permitted to stand till winter, and to be cut together according to Dr. Richardson's system.

The tithe of this meadow of 21 acres, has been compounded for at nine pounds sterling! We believe the Farnham hop-grounds, (of a garden cultivation) do not pay more than three guineas an acre for tithe. These results are all so extraordinary, and tend to purposes of such high utility, that we feel it would be doing injustice to the subject, did we not enlarge a little more on the facts which are supposed to establish them: for this purpose we subjoin the following extracts, chiefly from the letter to lord Hertford.

"I made my notices public, not only in Ireland, but announced in the Gentleman's Magazine, London, and in the Farmer's Magazine, Edinburgh, that I should mow on the 1st and 15th of every month, from October to March; and that during that whole time I should have hay exposed to the weather, in the operation of making. I performed my promise punctually, in the view of every amateur who thought fit to call, as many did. On December 15, the snow was five inches deep on the ground; yet I proceeded, and was little molested by it, a toss with a fork at once shaking off the snow from the sward. January 14, a gentleman came to my house, (this was Mr. Farish) sent from Dumfriesshire, with a letter of introduction from the venerable and spirited Patrick Miller, of Dalswinton. Curiosity had been excited in that county, and this expensive mode was adopted, of ascertaining whether my Fiorin crops were as enormous as I had stated; and if I also mowed and made hay at that untoward season. Through the evening of the 14th, I was amused with perceiving

that my visitor suspected a hoax." (We are surprised he could entertain so improbable a suspicion). "His doubts, however, were removed the next morning, when he saw the business proceeding regularly, and the hay, which had been cut on the preceding first and fifteenths, standing in the field in excellent order. Since he returned to Scotland, I have had letters both from Mr. Miller and him: he informs me he is preparing a publication, reporting what he saw, and confirming every statement he had met with in my different memoirs." (P. 25, 26, Letter.)

"On the 15th December, 1808, I mowed as usual, and put my hay into lap-cocks the same day; on the 17th, the severest snow remembered in this country came on, and covered the ground deep for five or six weeks; on February the 3d, my friend lord viscount Northland, and the provost of Dungannon came to examine my hay. They certify that my lap-cocks were in the best possible preservation, of excellent quality, and that it was deposed before them upon oath, that the lap-cocks had not been loosened since the day that they were cut, December 15th." (Letter, p. 28.)

"I selected a parcel of fresh well-flavoured natural hay, and an equal quantity from the Fiorin stack, put up in November. These parcels were placed equally within the reach of horses, cows, and stalled oxen, all of which ate freely and with relish of the Fiorin, in preference to the other hay; and when the Fiorin was removed and the other left, the stalled cattle refused to eat at all. This property was likewise further confirmed by the sheep, upon two small ricks, the one of Fiorin, and the other of natural hay, put up within the sheep-walk, and to which they had access at pleasure. The author observed them every day feeding greedily at the Fiorin rick, whilst they appeared only to use the other as a rubbing post, (Mr. Farish, p. 16.) A small shock of Fiorin, which had stood uncut the whole season, and lay in Mr. Miller's room till it appeared white and withered, was carried into the stable, and part of it presented by the coachman to every horse, along with a parcel of fine sweet clover hay, they not only eat the Fiorin with great relish, and sought eagerly for

more, but refused the clover as a food they could obtain at any time." (P. 46. Treatise.)

"On December 22d, some young ladies, who took milk for supper, observed that it was remarkably rich and well-flavoured; we all tasted, and agreed in opinion. I alone knew that my cows had been put upon green Fiorin three days before. The milk continued of the same quality through the winter, and was much enjoyed.

"In the month of March, I went abroad for a week: on my return the 22d, Mrs. R. told me at supper, the milk had lost its flavour, the Fiorin she supposed growing old. I could not deny that the milk was much fallen off, and its richness gone; fearing to my mortification that Mrs. R. had accounted for it. Next morning I inquired for the confidential labourer, who took care of my cows, and of my Fiorin. I was told he had been absent five days, sowing his oats. "Who cut Fiorin for the cows?"—A. "No one would venture in his absence and yours!"—Matters were soon set to rights: the Fiorin was restored to the cows, and the flavour to the milk, without any abatement until the end of April, when the crop was expended." (P. 32, 33.)

"In October, 1806, in making a dam, I flooded some Fiorin roots 20 inches deep: the water has never been taken off for a moment; yet these roots continue to send up stolones to the surface, apparently in good health. In April, 1807, I put a root of Fiorin grass, with a very little earth about it, on the top of my garden-wall. It never has been approached since: yet, notwithstanding the severe drought of this season, the grass preserves its usual verdure." (P. 38. Letter.)

We shall not attempt to add any thing to this curious account of the properties of the Fiorin, but proceed to the mode of its propagation and culture. This is as singular as any of the properties we have already noticed. Although, as we have before observed, it produces pannicles and seeds in the common way, yet it is impossible to obtain a crop by seed, the usual mode of raising other grasses. The seed is so diminutive and slow in regetation, and the young tendrils protected with so much diffi-

culty from weeds and other spontaneous grasses, that they are soon choked and disappear. To compensate this apparent disadvantage,

" Harmonious Nature's secret-working hand"

has bestowed on this "favourite grass," by means of the stolones which we have mentioned, a facility of propagation superior to that of any other vegetable.

We have stated and described the active principle of life by which the stolones are animated: to render it efficient for the multiplication of the species, nothing more is necessary than to take them either fresh torn up from the ground in their green state, or from the rick or loft even five months after mowing, to scatter them over a raw surface of soil, at their full length or cut into pieces, and lastly to sprinkle them over with a little loose earth. Taking root at every joint, and throwing out fresh strings from each root, they need not by any means be planted thick or in large quantities. Rows at intervals of a yard, will in one season cover the whole surface with a sward thicker and more plentiful than any old meadow.

To those who find any difficulty in procuring the plant in their own neighbourhood, the facility of transmission is very great. "Two strings or stolones were sent from Ireland in September, 1808, to a noble earl in the north of Scotland, in his common frank." In thirteen months they had so propagated, as to enable him to plant out two acres.

The best season for laying down land with Fiorin, may be ascertained by referring to some of its peculiar properties. It vegetates with equal vigour almost during the whole year, certainly till after Christmas; consequently it does not grow so rapidly in the spring, as some of those grasses and weeds whose principal vegetation is confined to three or four months. During that period very expensive processes of weeding and cleansing could alone preserve the young Fiorin from being smothered by its more puissant rivals. We must, therefore, consider at what season these rivals, being checked in their vegetation, are least likely to intrude upon our plant, while the latter at the same time re-

tains its accustomed vigour of growth. It will be found to be from about the 20th September to the end of October: for in this season few weeds or spontaneous grasses will come forward. and even should they make a feeble effort, the weakly plant will probably be destroyed by early frosts. While this enemy to vegetation, so far from destroying Fiorin, is generally unable entirely to prevent the elongation of its stolones. But the vegetative powers of the Fiorin being still in their strongest action in September and October, its stolones will instantly strike root, and establish themselves in vigour; they will therefore in the ensuing spring be able to commence their efforts in strength, and with great advantage over the Fiorin laid down at any other season. It may be observed, that this period is peculiarly favourable to the general arrangements of farmers. They have only to plow up the ground immediately after harvest, and to put the strings into the earth early in October, in order to secure a hay-crop the very next year, without losing the benefit of a single season.

The principal expense attending the cultivation on fresh land, consists in fencing and weeding. And when once the plant is well fixed in the soil, there is every reason to suppose from the experience hitherto had, that a Fiorin meadow will not want breaking up or renovating for a long course of years; but will on the contrary, with very little care, continue gradually to improve in strength and luxuriance, and of course in quantity of produce.

The facts upon record relative to the Orcheston meadow, seem to be conclusive on this subject. The nature of the grass, accompanied by such descriptions as clearly demonstrate it to have been Fiorin, is first recorded by Camden in his Britannia, a work the first edition of which was published in the year 1586. It was afterwards observed by Mr. Stillingfleet, early in the last century; since by Curtis and Swayne, and lastly by two correspondents of the Bath Agricultural Society. So that a regular series of evidence attests the continued existence of this grass in one place for more than two centuries, and this by its own spontaneous exertion, without any pains taken on the part of man to preserve it.

3. The advantages to be derived from any new discovery are very apt to be over-estimated by the first discoverers. A plentiful and nutritious green food in the latter months of winter, is, however, without doubt, a great désideratum among farmers. The prospect of obtaining it from this grass, will be duly appreciated by all who have seen, on one hand, their stock of animals starving before their eyes, in a severe winter, while tracts of common, bog, heath, or other unprofitable waste, lie extended on the other.

"Smooth'd up with snow, and what is land unknown,

" What water of the still unfrozen spring."

#### REMARKS.

Fiorin grass is a native of the commons of Philadelphia, but has never been cultivated as a crop in Pennsylvania: it exists naturally in so starved a state, that no animal except a sheep, could lay hold of it. In England, it is the general, and almost the only herbage of the old, but worn out downs; forming a thick tough covering over the lands, which preserves itself, and destroys every thing else. The soil of Dr. Richardson's farm must be peculiarly favourable to the growth of Fiorin, for it has never been cultivated in England. The high character he has given of Fiorin will, however, probably induce many others to propagate it; and hence we shall be enabled to ascertain whether the plant suits other soils besides that of Dr. Richardson.

Fiorin composes the greater part of two meadows, at "Orcheston," (a village lying six miles to the N. W. of Amesbury), in Wiltshire, which has been celebrated for a long time for its luxuriant growth of grass. These meadows adjoin each other, and contain together only two acres and a half; and in rainy seasons produce most abundant crops. "A rivulet passes through them, and being situated at a sharp turn of a narrow part of the valley, the water makes an eddy, and deposits its sediment upon them. The substratum of these meadows is an almost entire bed of loose flints, in which the roots of grass.

freely run, and produce strong succulent shoots, which fall, and taking root at the joints, send forth other shoots, which in like manner drop and root again, so that the stalk is frequently eight or ten feet in length from the original root; and though the crop is very thick, it is perhaps not 18 inches high." The grass is very succulent, and the hay exceedingly nutritive. But in dry seasons, the crop is small, and of a bad quality.\*

### ON AMERICAN OPIUM.

The following is an abstract of the various attempts at making opium, in the United States.

DR. S. RICKETSON, formerly of Duchess county, New York, but now of the city of New York, cultivated the poppy in the year 1788, and found that the opium produced from it was quite as powerful as that imported. His paper first appeared in the "American Magazine," published at New York, in 1788; and was reprinted in the Medical Repository, Vol. 1, p. 420. In the 3d Vol. of the same work, p. 206, Dr. R. published additional experiments on the same subject. Those varieties of the poppy should be chosen, having numerous heads and strong stalks. Dr. R. found such a variety with large red or purple flowers, that proved much superior to all others he had seen: he tried the Asiatic mode of tapping the heads, and found that they yielded most plentifully from 8 to 12 days after the flowers had fallen: he however obtained the largest quantity of juice by cutting off the stalks, when the sun shines, about an inch below the flowers of the plant; and as soon as the juice appeared, by collecting it with a small scoop or penknife. After the juice ceased to flow, he cut it about an inch lower, and thus proceeded until the juice ceased to appear.

The seeds may be sown at the distance of six or eight inches.

<sup>\*</sup> Davis's View of Wiltshire, p. 131. London, 1811.

<sup>†</sup> The careful country practitioner, who may raise opium in the above ways, should try the effects of the two kinds.

He is convinced there is no difference in the quality of the produce, whatever variety or species be cultivated.

Dr. Anthony, of Petersburgh, Georgia, in the month of January, 1810, sowed seeds of the true white or opium poppy, which came up in due time. The second day after the petals had fallen, he divided the exterior coat of the head in four places, at equal distances from each other: more incisions, he thinks, would tend to wound and destroy the head unnecessarily. The incisions were made at ten o'clock in the morning, and at twelve he collected the opium that hung therefrom, in tears from one inch to an inch and a half in length. Another bleeding, in the afternoon of the same day, yielded as much as was obtained in the morning. He carefully avoided penetrating the cavity of the head. Every head made from 15 to 40 grains of opium; and they would have yielded more, could he have attended closely to the plants. A piece of ground, six yards by ten, produced more than half a pound of opium. He sowed the seeds at the distance of eight or ten inches apart, in drills, and about three quarters of an inch deep: the drills were two feet apart. He thinks it necessary to sow the seeds in moist ground. Many of the full blown flowers measured from seven and a half, to eight inches in width: the heads measured from two and a half, to three and a half inches diameter.\*

Dr. Spalding, of Portsmouth, (N. H.) has also made opium from the white poppy; samples of which he presented to the Medical Society of the Eastern District of New Hampshire: he procured it by incisions in the heads, after the capsules were fully formed.

The seeds should be sown in good ground, as early as the season, in the different parts of the continent, will admit; the plants must be properly watered, and kept clear of weeds. Transplanting does not succeed.

The poppy plant has been cultivated extensively by Mr. Ball

<sup>\*</sup> Philadelphia Medical Museum, Hexade 2d, Vol. 1, p. 142-

<sup>†</sup> Medical Repository, Hexade 3d, Vol. 1, p. 193.

and Mr. Jones, in England; both of whom have received premiums from the society for the encouragement of arts, agriculture, &c. The opium produced by them, was found by the London physicians, whose certificates are given, to be fully equal to the imported drug. For the statements of Mr. Ball and Mr. Jones, see Transactions Society Arts, Vol. 18, and Medical Repository, Vol. 1, p. 424; see also Domestic Encyclopedia, article poppy."

The cultivation of the poppy plant, for the purpose of making opium, is particularly adapted to the Southern States. Opium might form one of the articles that must be substituted for cotton, now that it is found much more of it is raised in the world than is required. But it is not likely that the hint will be taken; although the profit would be certain, if not great. Every physician in the United States, living in the country, might make all the opium he used, by raising the poppy: an employment that would not only prove amusing, but highly profitable to him.

Mr. Ball calculated, that supposing one poppy plant growing on one foot square of earth, produced one grain of opium; more than 50 lbs. will be collected from one statute acre: but one poppy produces from three to ten heads, and in each head from six to ten incisions are made; from each of which he took two or three grains;—what then, he asks, must be the produce? Double, or semi-double poppies, gave more than twice the quantity produced by the single.

WEIGHTS OF PRIZE CATTLE AT THE SMITHFIELD SHOW, IN DECEMBER, 1806.

[From the Monthly Magazine, London.]

1. MR. WESTCAR'S red Hereford ox; regularly worked for more than two years, ending 14th January, 1806, then put to fatten, being in fair working condition: eat neither corn, (grain)\* nor oil cake, until the 12th April 1806. From the 1st October,

<sup>\*</sup> Either barley meal or oats are here meant. Editor.

to the 30th November, he eat no other food except 1160 lbs. of hay, and 400 linseed cakes:

				Stone.	lb. at 8	3 lbs.
'Carcase	e, or	quart	ers,	229	3	1835 lbs.
Fat,				. 28	5	229
Feet,				4	5	38
In all,				 300	2	2402

Mr. John Westcar's light red Hereford ox; put to fatten on the 8th January, 1806, being then in working condition; after which he ate no other food but grass, hay, and turnips:

Carcase	е,		•	154	0	1234 lbs.
Fat,				15	0	120
Feet,				3	3	27
In all,				198	3	1587

Mr. John Edmond's red Hereford ox; regularly worked in harness for more than two years, ending the 9th January, 1806, then rather in low condition, rising five years old; fattened on grass and hay only:

Carcase	,			. 154	4	1236
Fat,			•	. 17	3	136
Feet,			•	3	0	24
In all,				217	7	1743

Mr. Samuel Chandler's brown Devonshire ox, bought in Devonshire on the 28th April, 1806; then five years old: had worked all the barley season; travelled 170 miles; was then lean. From the 7th May to the 27th October, fed on grass; after which his food, hay and Swedish turnips only:

Carcase,		•			119	6	958 lbs.
Fat,		•	•		17	3	139
Feet,					2	$7\frac{1}{4}$	$23\frac{1}{4}$
In all,	•	•		•	156	61	12541

Mr. Westcar's yellow Hereford ox; put to fatten on the 6th

January, 1806, being then in fair working condition; after which he eat no other food but grass, hay and turnips:

137	1			Stone.	b.	lbs.
Carcase	,	•		138	5	1109
Fat,				. 21	0	, 168
Feet,				. 3	0	24
In all,				197	5	1491

Mr. S. Chandler's brindled half-bred Devonshire steer; three years old the 11th May, 1806; went with the breeding stock until the 10th May, then in store condition, put to fatten on grass, hay, and oil cakes:

Carcase,		•			129	0	1032
Fat,					16	6	134
Feet,					3	0	24
In all,					164	6	1318

Mr. Lucas's red cow, had borne three calves, milked to the 5th January, 1806, then in a very lean state; kept on hay until the 18th August, after which she was fed on hay and oil cake:

Carcase,				173	2	1386
Fat,				25	0	200
In all,				253	0	2024

Mr. Lucas's dun-coloured short-horned cow, had borne three calves; bought in March, 1806, then in store condition; after which was fed on grass, hay, and oil cake:

Carcase,				179	2	1435
Fat,				18	0	144
Feet,		• .		3	0	24
In all.				230	5	1845

#### REMARKS.

When it is considered how short a time some of the above cattle were feeding, it will be allowed that their weights were considerable. It was for this rapid feeding, and their fine forms, which are generally connected, that the premiums were given. The English graziers are now convinced, that their very large cattle, which formerly gained so much of their attention, are not profitable stock, and hence are given up for the smaller and more quickly feeding breeds.

Editor.

#### ACCOUNT

Of the weights of twelve sheep, raised and fed by James Hickman, of Delaware county, Pennsylvania; killed by Mr. Groffe, in the spring of 1809.

	Weight alive.	Mutton.	Skin.	Fat.
1st,	274 lb.	1493 lb.	21 lb.	25 lb.
2d,	226	127	20	25
3d,	226	124	20	22
4th,	210	1243	19	26
5th,	206	112	24	19
6th,	200	110	18	20
7th,		111	19	_
8th,	_	108	_	-
9th,	. —	108	_	-
10th,	-	108		
11th,	-	107	-	-
12th,	- '	106	21	303
				-

Delaware County, May 23d, 1809.

SIR.

This is to inform you respecting my sheep: they are of my own raising, and of the Irish breed of Mr. Jeffries.\* I have the ram that got them; he is 7-8 blooded. They were not quite three years old; and were all, except two, twin lambs: the largest of them all was a twin. I have the sister of him now. I gave them no corn in the summer, but some during the first two

<sup>\*</sup> C. and E. Jeffries, of West Chester. The original ram was imported by the brother of Messrs. J. from Ireland, a few years since.

Editor.

winters; the third winter I fed them as the weather admitted. In cold frosty weather, they had one quart of corn a piece three times a day: in warm weather, they would not bear so much. I gave them oats sometimes in damp weather. Several of them were out of common country ewes.

## JAMES HICKMAN.

Dr. James Mease, Philadelphia.

The weights of Mr. Hickman's sheep, show what good keep will produce in animals disposed to take on flesh and fat. But it is questionable, whether such sheep are as profitable as other breeds, which come sooner to maturity, and that are fit for the shambles off grass. Experiments to determine this point, require great care, patience, and attention to particulars, which few are disposed to bestow. Some facts are, however, on record, from which a tolerable opinion may be formed upon this important subject. The following statement of the weights of some prize sheep, exhibited at the Smithfield cattle show (London) in December, 1806, may probably throw light on it:

One year old long-woolled sheep. Mr. A. Lechmere's Leicester and Ryeland wethers, fed on grass only, until November, 1806, after which they had a few turnips:

Live weights	of	three,	1711 lbs.	173	1821
Carcases	_		115	119	121

Rev. Mr. Plaskit's three new Leicester wethers, one year old and upwards, grazed with others of the same age, at the rate of seven to the acre, in the same pasture, from the 1st May to the 15th November, 1806, when they were removed to fresh grass, and were allowed 112 lb. of hay, and three bushels Norfolk turnips, sliced:

Carcase	e and	heads,		113	lbs.	106	102
Fat,				13		14	16
Live w	eight			166		163	153

Two year old wether sheep, fed without corn or cake. Mr

J. Edmond's new Leicester wethers, two years old in March, 1806, and were fattened on grass, hay, and turnips only:

Carcases and heads	, .	170 lbs.	188	166
Fat,		. 22	16	17
Live weights.		242	256	225. *

Two year old short-woolled wether sheep, fed without corn or cake. Mr. H. King's Southdown wethers, purchased on the 9th June, 1806, then in store state, and were fattened on grass only:

Carcase	s and hea	ds,	95 lbs	. 101	94
Fat,	-6.		131	14	131
Live we	ights.		146	154	144

The farmer who wishes to make a calculation between the profit of Irish sheep and the new Leicester breed, or between the Irish breed and the Merino crossed with our own common sheep, must take into consideration, (besides the difference of their weights and prices), the expense of keep, and risques from disease, accidents, and those worthless animals, dogs;\* all which are lessened by keeping a sheep one or two years instead of three; and those who fatten sheep for their own table, will also have a reference to the superior flavour, fineness of grain, and delicacy of middle-sized mutton, not unnecessarily loaded with fat. Of the extra quantity of this substance, found in large old sheep, fed with grain, no use is made except by the soap and tallow-chandlers.

#### CATTLE SHOW.

THE sixth show, under the direction of the Pennsylvania society, for improving the breed of cattle, was held at Bush Hill, on the 12th of November last: the day was fine, and the company and stock numerous—It was pleasing to see many persons from the neighbouring states, at the show, who are interested in

<sup>\*</sup> This epithet is confined to dogs in those counties not infested by wild animals.

the success of the plan adopted by the society, for improving the quality of stock, and for facilitating their purchase and sale.

The following stock were exhibited:-

By Jarvis Mudge—Seventy-six head of store cattle; fifty of which were supposed to weigh 900 pounds, the four quarters. These cattle came from near Lake Ontario—and were disposed of at the show. Twenty head of store cattle, belonging to another person, were also sold there.

George Hopple, of Philadelphia—Seven head of cattle—one of which is remarkably large; laid at 2000 pounds, the four quarters when fat—he is five years old, and is intended to have a fair opportunity of showing his capacity for carrying flesh and fat during the two succeeding years. Another five years old, laid at 1200 pounds, the four quarters; the other five are supposed to weigh 1000 pounds each, the four quarters.

Richard Smith, of Philadelphia—Two rams of the new Leicester breed—one of them was imported in the autumn of 1808, the other was bred by Mr. Smith.

Edward Sprogle, of Philadelphia co.—A large fat ox, seven years old; weight of four quarters supposed 1500 pounds.

Martin Dubs, of Philadelphia—Nine very fine and very fat oxen, six and seven years old, and two spayed heifers, five years old.\*

James Clark, near the Rising Sun, Philadelphia county-One

\* Turnpike Scales, November 11th, 1811

## Weighed 11 cattle for Martin Dubs, viz.

						Cwt.	qr	. lb.
2	Eastern Cattle,	weigh	ied	4		39	3	00
2	Brindles,		٠, -			37	0	10
1	Black spayed he	eifer,		4		15	3	00
1	Brindle heifer,					15	0	00
2	Small brindles,		9			33	2	10
2	Young cattle,		• .		,,	36	3	07
1	Pyed ox,			,		19	0	18
	-11					197	0	20

JOSEPH HANSEL

ram of the new Leicester breed, six months old; weight 133 pounds—sheared 2½ pounds of wool the last of June.

Richard Choyce, near Trenton—Five ewes of the new Leicester breed, from two to four years of age. These ewes were well covered with good wool, and their forms were symmetry itself. The scientific master, Bakewell, who originated the breed, could not have shown more perfect figures of equal blood. It is to be regretted that all those farmers of Pennsylvania and New Jersey, who still continue to keep the flat-sided, narrow-backed, native sheep; or those who esteem none but the mammoth Irish breed; neither of which can be brought to the shambles without a tedious and expensive process of stall-feeding—did not see the beautiful ewes of Mr. Choyce—a breed requiring nothing except good grass to render them fit for any table. The ewes were sold to Mr. Barney for 100 dollars.

Benjamin Wilson, of Philadelphia, again favoured the amateurs of fine cattle, by bringing his cow of a cross between the Suffolk polled and Teeswater breeds. The cow is now 8 years old. A thriving and promising bull-calf from her was also exhibited.

John Barney-

- 1. An ox of fine figure and very fat, raised by Messrs. Guier, Diehl, and Clark, from the Dutch breed of Robert Waln; now the property of Mr. Barney—supposed to weigh 1500 lb. the four quarters. The hind quarters are larger than any ox yet shown in Philadelphia.
  - 2. Nine large oxen fatted by Mrs Barney, in high order.
- 3. A handsome cow, with a calf and two yearlings, descended from an imported cow.

Upwards of three hundred head of cattle were brought from New York, for the purpose of sale at the fair, but purchasers having offered on their arrival before the show, they were sold. The drovers and proprietors declared their intention of again attending the fair in the spring.

Nathaniel Newlin, of Darby, three steers. The two largest, (twins) rising six years, were from a bull descended from a cow

of the Teeswater breed, and a cow raised by Mr. Newlin himself. Their forms were fine. Also, another steer two years old last spring, and supposed to weigh 900 lbs. the four quarters. They were in good order, although they had only the common pasture of the farm stock.

Lawrence Seckel, president of the society, brought up from his luxuriant meadows at Schuylkill Point, eight cattle, five years old, remarkably fine; and when they have finished their course of feeding, will weigh 1000 lbs. each.

Mr. Muller, a Portuguese gentleman, brought 60 head of Merino sheep—but were not sold.

Mr. Bakewell, from near Norristown—Two full-blood hogs of the English Berkshire breed. The boar, three and a half years old, weighed 400 lbs.; the sow, thirteen months, weighed 200 lbs. The original stock of these hogs were imported into Connecticut by Mr. Russel.\*

George Hopple exhibited three stud horses-

1. Volunteer—a bright bay, got by the full blooded turf horse Stargazer; 6 years old, and 16 hands high.

2. Arabian—a gray, got by Stargazer; 4 years old, 161 hands high.

3. Gunpowder—a blood bay, got by the full blooded turf horse Gunpowder; 3 years old, 16 hands high.

The dam of the above three horses was got by Morick Ball, and her dam by old Figure; both blooded turf horses.

An invitation having been given to the patentees and improvers of ploughs, to exhibit and try them, Robert Smith, of Bucks county, and David Dickenson, of Wilmington, Delaware, came with ploughs; but owing to the show continuing only one day, they were not put in the ground. These spirited mechanics,

<sup>\*</sup> This breed is of a reddish colour, with brown or black spots, broad sides, short legs, large ears and pendant over the eyes; body thick, close and well made—kindly disposed to fatten, and attaining a large size, but require a large and constant supply of food. Hence they answer well to be kept at distilleries: their flesh is fine. Treasise on Live Stock. London, 1810.

however, intend to bring them to the next spring show. It is to be wished that their example may be followed by others.

Mr. Bamford exhibited and worked a roving and spinning worsted machine, of twenty-three spindles; it works by hand, and spins 9 lbs. of wool a day, of 30 cuts to the lb. It will spin as much wool as three men can comb. This machine is intended for Newark, New Jersey.

## FIRST MEETING OF THE MERINO SOCIETY OF THE MIDDLE STATES.

ON Saturday the 5th of this month, the Merino Society of the Middle States held their first stated meeting since their organization, at the farm of Mr. Caldwell, their president, near Haddonfield, in Jersey. Besides the members of this most laudable association, several farmers, proprietors, and manufacturers attended, and count Pahlen, doctor Logan, with some other gentlemen, were present as guests. Between two and three hundred full-blooded Merinos, in the finest order, both of fleece and flesh, some in the open enclosures, others in separate folds, were exhibited: their appearance proving, beyond all controversy, that the soil, climate, and food of Jersey, are fully congenial with the health and excellence of this inestimable animal. A large number of those examined on the present occasion, when purchased from the importers were feeble, pining, and more or less diseased: but the whole flock is now completely recruited and re-established in at least as good condition as they ever enjoyed in Spain. As the Spanish sheep improve the fleece of the sheep of England, France, and other countries, to which they have been transported, there is every reason to believe from that circumstance alone, that their amelioration will attend their establishment in the United States, and that by care and attention to preserve the breed pure, the Merino may reach the highest state of perfection in the United States. And it is certain that Mr. Caldwell, in all his enterprising purchases from the late importations of Spanish sheep, has never met with any equal in appear-

ance, fineness of fleece or length of pile, to those of his own raising from his own original flock. About one hundred lambs have been the produce of this year, nearly all of which have been so far reared without accident or distemper. Reduced as Spain is, beyond all hopes of immediate reinstatement, and indeed with the moral certainty of further devastations, cut off as we are by England from French supplies of cloths, and resolved as we ought to be, ourselves, not to import from England, while she insists on monopolizing our market, the accession of Merino wool, to the stock of American staples, is matter of the highest gratification. In a few years we may undoubtedly furnish our own consumption, and perhaps export fine wool in large quantities, as we have cotton. The factory of Messrs. Dupont and Bauduy, near Wilmington, is already well advanced in its operations, on an extensive scale, and will, before the expiration of this year, turn out superfine cloths of the finest and most durable fabric; and the zeal which animates almost every portion of the community, for achieving this great measure of American independence, is the sure pledge of its early and complete success.

After visiting the various accommodations which Mr. Caldwell has arranged for the preservation and comfort of his fine flock, the company sat down between three and four o'clock, to an elegant dinner, spread in the genuine American exuberance, and passed the remainder of the afternoon in social and rational festivity.

#### OLIVER EVANS ON HIS STOVE FOR BURNING LEHIGH COAL. .

IN the year 1798, I heard of the immense coal mines discovered near the river Lehigh, Pennsylvania: but was informed that they were so difficult to kindle, that they could not be used. I commenced the study of the principles necessary to be applied to burn the most incombustible kinds of fuel.

I soon concluded that the fuel must be enclosed, to prevent the heat from escaping too freely from it, and that the air used to kindle it, must be directed to pass up through it, and that no other air should be suffered to pass up the chimney, and that this required a close stove of a peculiar form, with the disadvantage of enclosing the light.

To obtain the benefits of the light of the fire from a close stove at first appeared to be very difficult, as glass doors would not stand the heat; but by making doors or windows with two plates of sheet iron, pierced with holes three-fourths of an inch diameter, which holes I closed with small panes of common window glass, not larger than a cent, let in between the iron plates, I found the glass in this form would bear the heat of the fire, without cracking; perhaps they would admit of being as large as a dollar, and admit a considerable portion of the light.

My next experiment was with a mineral substance called tale; vulgarly but improperly called isingglass; doors and windows of which I found would bear a great degree of heat before it became opake.

Having entered fully into the study of the principles of warming apartments, I endeavoured to add every other improvement to my stove that it would admit of, to save fuel, make it convenient for various purposes, and suitable for every kind of fuel, &c. and I got four small ones made to try experiments, in burning the Lehigh coals.

There remained in the cellar of the late John Nicholson, Esq. about 30 tons which had been deemed useless, and I was permitted to clear the cellar of them; they served for my experiments.

I found that the hardest and most incombustible quantity of the Lehigh coals that would not burn in an open grate, was easily kindled in my stoves, burning with a brightness far exceeding any open fire, displaying light sufficient to read newspapers by, making the most durable, amusing, clear, and agreeable fire I had ever seen.

This stove I patented with all its new principles in 1800, calling it the luminous stove. And I called a meeting of such owners of the Lehigh coal mines as were to be found in Philadelphia, three different times, to show them how their coals would

burn. First in my stoves, secondly in an open grate properly constructed with a register,\* to direct the air up through them, to kindle them. Thirdly, to drive any steam engine. In such experiment the coals burnt to their full satisfaction, making the most amusing and pleasant fire, especially when used in the close luminous stove, where they burn with the greatest brightness, while we enjoy the benefit of the light, and save fuel by using a close stove.

These coals will no doubt prove to be the cheapest, most durable, cleanly, and pleasant fuel, for warming apartments as well as for many other useful purposes. They produce the most intense heat. They heat iron without raising so great a scale on it as other coals do, they are no doubt the best for making edge tools, or for driving a steam engine, if the furnace be properly constructed to burn there; with them the boilers will last much longer, as they contain no sulphur to corrode the iron. The fumes of these coals is sweet and no way offensive; two fires last from day light until 10 o'clock at night, therefore would answer well to warm large public apartments, on Daniel Pettibone's plan of warming by heated air.

OLIVER EVANS.

## STEAM BOATS.

THE misfortunes or the follies of European nations, it has been observed, have contributed much to the good fortune and prosperity of America. There is truth in the observation—but we must be as careful in guarding against false conclusions drawn from acknowledged facts, as against falsehood itself:—A very common inference drawn from the acknowledged consequences of the misfortunes of Europe, is, that the effects must be temporary—but this is not true; because the good already derived must continue, if we have only the wisdom to protect it. An-

These grate stoves are now for sale in Philadelphia, and may be set in any part of a room.

other conclusion that is insinuated, rather than asserted, is, that we owe every thing to Europe; that we cannot do without Europe: in short, that we must be dependent on Europe for all the productions of art and genius. Those who thus deceive themselves, cannot deceive the country. The state of the arts, and the progress of manufactures, in the United States, give evidence of a ripeness and ingenuity in every branch of human pursuit, which requires only the encouragement and protection of provident and efficient laws, to place our arts and sciences upon equal ground with any nation of modern times.

The recent establishment of a steam boat on the western waters, carries in itself consequences much more important and exclusive, than the canal of Languedoc to France, or perhaps the celebrated dykes of Holland.

The friends to American improvements, must take pleasure in knowing, that this steam boat in all its parts, engine, boiler, and machinery, has been constructed at Pittsburgh. The western country is indebted to the enterprise of two of our own citizens, Messrs. Livingston and Fulton, for this important improvement in the navigation of the Mississippi. To build this boat a subscription was proposed at New-York and Pittsburg; where, after much exertion, so little confidence was placed in steam boats on untried waters, that not more than one-third of the capital required, could be raised; such tardiness would damp men who were not resolute to surmount all difficulties; the patentees themselves advanced the remainder, and the work has been completed in a most masterly manner, under the agency of Mr. Roosevelt, aided by Mr. Stowdinger, engineer in chief to Hudson's river steam boats; as a proof of her perfection, this beautiful vessel, 148 feet in length, 30 feet beam, has been tried with 140 tons of merchandise on board, and advanced at the rate of 3 miles an hour against a current of 21, on the 29th of October, in the presence of many hundred spectators. She left Pittsburgh for New Orleans, destined to trade between that city and Natchez; and there is little doubt that with care and perseverance, all the difficulties which were apprehended from snags, sawyers,

and planters,\* will be overcome, and the company amply remunerated.

Let us now for a moment contemplate this new science; this immense leap forward in the useful arts. Only five years ago, it was considered impracticable to make a useful steam boat, and Livingston and Fulton were universally ridiculed for the attempt: now there are on Hudson's river,

Between N	New York a	nd Alba	ny,	-	-	5
Between N	Vew York a	nd New	Bruns	wick,	-	1
On the De	laware,	-	-	-	-	1
On Lake (	Champlain,			-	-	1
On the Mi	ississippi,	-	-	-	-	1
Building o	n the St. L	awrence,	-			1
On Hudso	n's river as	a ferry l	ooat,	-		. 1
Building for	or ferry boa	ts from	New Y	ork to J	ersey	
city,	x10 5 011	-	-		in i	2
	Total,		-		HID.	13

This is more than two steam boats a year, since 1807, when Livingston and Fulton built their first boat. In every situation where they are established, their benefits are sensibly felt and acknowledged. And now it may be asked, what would the United States take to be deprived of this new art? Could one hundred millions of dollars compensate these states for the eternal privation of only this one American invention? Let the political economist answer this question. Have then two enterprising individuals given to our country an invention, in its effects worth 100 millions of dollars? Have we learnt to respect the useful arts and the incalculable blessings they bestow? Have we guarded them by protecting and encouraging laws; or are inventors, who are the most valuable members of society, to be for ever a prey to rapacious fraud and cupidity? Is not the exertion of mind the highest order of labour? Does it not extend every success to the benefit of whole nations, to millions of indi-

<sup>\*</sup> Bodies and parts of trees impedded in the river. Editor.

viduals? And shall it not in a wise government, among a wise people, find complete protection, while the labour of the hands, even to a peck of grain, is guarded against theft and plunder?\*

The productions of genius must be protected in order to prosper—with due protection, the extent of American ingenuity will very soon astonish and surpass all other nations.

#### HORSES AND SHEEP.

A COMPARATIVE view of the expenses and profits of raising horses and sheep.

Expenses of raising one colt, viz.

Finding the mare one winter, including loss of the	ne use	4
of her, and other unavoidable expenses,	<b>S40</b>	00
Finding the colt till four years old, at \$30 per ye	ear, 120	00
Amount, -	- 160	00
Risque of the life of the mare and colt, during the	rais-	
ing, is worth the interest of the amount for one	year, 9	60

\$169 60

<sup>\*</sup> Various attempts by Fitch, Rumsey, and others, had been made since 1783, in Philadelphia and New York, to navigate boats and vessels in the Delaware, by steam, and a few trips were actually made to Burlington, and to New Castle, by one of the boats, but they were then laid aside. From those failures, any man who proposed to propel boats by steam, was deemed a madman; and when Mr. Fulton talked of renewing the attempt, his mechanical and philosophical friends advised him against it. But united with Mr. R. R. Livingston, he has succeeded. A patent was obtained from the state of New York by these gentlemen, for the exclusive privilege of navigating the waters of that state by steam; and they built two boats, at the enormous expense of upwards of \$90,000, to ply between New York and Albany. The quick passages performed by those boats, and the superior accommodations also afforded by them, when compared with the common sloops, occasioned the latter to be totally deserted, and the enterprising proprietors were likely to be remunerated for the great capital expended, and the talent and ingenuity exerted. One hundred and sixty persons have been conveyed from New York to Albany, a distance of

Expenses of keeping 20 sheep for four years.

Feeding 20 sheep four years, at \$2 a year each, is \$40
a year, and four years is\* - - \$160 00

They will probably raise in the time 80 lambs, at \$2
each, which ought to be deducted, - - 160 00

They will produce annually \$30 worth of wool, which
will be a net gain of - - - 120 00

By this calculation it will appear, that the horse when raised,

By this calculation it will appear, that the horse when raised, must sell immediately on rising four years old, for the sum of 169 dollars 60 cents, to make the farmer whole for the expenses of raising him—And of course, if he should remain one year on hand without profitable employment, the whole expense of keeping a full grown horse a year, say 60 dollars, must be added.

But the business of raising sheep, calculated to the same amount of expense, refunds the cost of feeding, and leaves to the farmer a nett profit of 120 dollars. To which may be added the consideration of continual increase, by keeping them to any length of time. The advantage then in favour of raising sheep, rather than horses, is sufficiently proved by this estimate. And the immense and irreparable loss to individuals and the community, which attends the keeping of idle horses, should lead men to pursue a more rational course. It is unquestionably true from the premises, that the expenses of keeping one idle horse for an ordinary life time, say 20 years, would be 20 times 60, or 1200 dollars—a sum sufficient to buy your son a neat little farm, for ever lost. The same expense employed for the same term in raising sheep, would produce at least the same amount in absolute gain. The loss attendant on keeping an idle horse, should

160 miles in 24 hours; and on the 12th October, 1810, the passage was performed from Albany to New York, in 18 hours!! This success induced a company at Albany to build one or two boats in opposition. Against this company, Messrs. L. and F. have commenced a suit for invading their patent. Editor.

<sup>\*</sup> This estimate is too low. To keep a sheep as he ought to be, summer and winter, will cost \$4 per year. But even at that rate, the superior profit of sheep is evident.

Editor.

be added to the sum, which with the same money differently applied, might be gained—that is, 2400 dollars more. Then the fair conclusion, that the comparative advantage of raising sheep, rather than keeping one surplus or unnecessary horse in 20 years, is 3,600.

## TO MERCHANTS TRADING TO THE SPANISH MAIN.

THE merchants who trade to Carracas and other parts of the Spanish Main, are requested to endeavour to introduce into this country, a very valuable South American plant, an account of which was given by Mr. Vargas, in London, and published in the annals of Botany, No. 2, p. 400. The popular name in South America is Arracacha, and it is one of the most useful plants in that country-Order, Umbelliferæ; in its habits it resembles an Apium, and therefore sometimes called Apio. Its stalk generally divides from the upper part of the root into several stems, thickly beset with large orbicular leaves gashed into several sinuses, and supported by large tubular petioles, exceeding a goose quill in thickness—The roots immediately divide into four or five branches; and each of these, if the soil be light and the weather favourable, will grow to the size, and have nearly the shape of a large cow's horn. This root yields a food which is prepared in the kitchens in the same manner as potatoes. It is extremely grateful to the palate, more close than mealy: it is so tender that it requires little cooking, and so easy of digestion, that it is the common practice of the country to give it to convalescents and persons with weak stomachs, being thought much less flatulent than potatoes. Of its fecula is made starch, and a variety of pastry work; reduced to a pulp this root also enters into the composition of certain fermented liquors, supposed to be very proper to restore the lost tone of the stomach. In the city of Santa Fe, and indeed, in all places of this kingdom, where they can obtain the Arracacha, they are of full as universal use as the potatoes are in England. Its cultivation requires a deep black

mould, that will easily yield to the descent of the large vertical roots. It is propagated by cutting the root in pieces, each having an eye or shoot, and by planting these in separate holes. After three or four months, the roots are of sufficient size and quantity to be used for culinary purposes; but if suffered to remain six months in the ground, they will often acquire an immense size, without any detriment to their taste. The colour of the root is either white, yellow, or purple; but all are of the same quality. The most esteemed are those of Liparon, about ten leagues north of the capital (S'Fe). Like the potatoe, it does not thrive in the hotter regions of the kingdom, for there the roots do not acquire any size, but throw up a greater number of stems, or at best they will be but small and of indifferent flavour. It thrives best in the elevated regions of the mountains, where the medium heat is between 58 and 60 degrees of Fahrenheit's scale; here it is that these roots grow most luxuriantly, and acquire the most delicious taste. Mr. Vargas believes it peculiar to the province of Carracas and kingdom of Santa Fe, as he has met with it in no other part of America where he has been, nor is it spoken of by any writer on America, except by Alcedo, who mentions it in a few words at the end of his Diccionario Geograpico -Historico de las Indias occidentales o America. It is indeed surprising, that such a useful vegetable should not yet have found a writer to make us acquainted with its history, or a Sir Walter Raleigh, to convey it as a valuable present to other regions, as it might easily be conveyed by seeds or roots.

We learn from the same gentleman, that on the elevated parts of Santa Fe, a shrub is met with called Ubillo—in habit much like the hawthorn, bearing innumerable small black berries, the expressed juice of which, without any preparation, yields a permanent ink. At first, before it is dry, the ink is of a pale red colour, but changes to a bright black as soon as exposed to the air. On staining one's hands, or any other part, several days are required to remove the spot; the only thing you can do, is to wash the part with lemon juice, which converts the black into a rose colour. The juice of the Ubillo may be inspissated, and

afterwards reduced to a powder: this is easily portable; and to make ink extempore, it is only necessary to dissolve a small portion of it in some water. [N. B. The common elder is used at Newark, New-Jersey, to make ink.]

## CAUTION TO DAIRY MEN.

THE following paragraph was published in the newspapers of the United States early in the beginning of the year 1811.

Nassau, January 27. Captain Penna, of the schooner Aviso, who arrived here on Monday last from Havanna, informs, that about the end of last month a vessel arrived from New-York, having on board, among other articles, 50 casks of cheese; that the cargo being landed and the sales commenced, two soldiers, a woman, and a boy, having eaten of the cheese, swelled to an enormous degree, and soon after died; and many other people were more or less affected with disease from the same cause; that his excellency the marquis of Someruelos, captain general, thereupon caused the American cheese found in the city to be seized and stored at one place, where a committee of physicians were directed to examine into the nature of the poison with which it seemed impregnated: they reported that all the rats, immense numbers of which animals were in and about the store, had died from eating the cheese, whereupon they recommended that it should all be destroyed. The whole of the cheese was, in consequence, carried to a public place in the suburbs, called San Lazaro, and there burnt, and an order was issued, prohibiting, under severe penalties, the landing of cheese from American vessels.

In the beginning of October, six young persons in one family, in the western part of Philadelphia, eat of cheese in the course of the night, and were seized early next morning with violent puking, which lasted the whole of the forenoon.

The Boston Centinel of October 13, 1810, states that three persons, by eating new cheese coloured very yellow, were seized

with violent puking. The Boston Gazette of the 30th of November, 1810, also states that five persons in a family were affected in a similar way, from the same cause. It is particularly mentioned in this case, that the rind was not eaten.

These facts deserve the serious attention of the dairy men of New-York and the eastern States, where the whole of the cheese for exportation is made. The cheese made in New-Jersey and sold in the Philadelphia market, is never coloured. The substance formerly used to colour cheese, is the extract of a plant growing in South America, and well known by the name Anatto. The diminution of intercourse between North and South America for some years past, has caused the stock of Anatto to be exhausted, and has induced the use of some injurious substitute, which, if not discontinued, will entirely destroy the character of American cheese in foreign markets, and those farmers who depend upon the dairy will feel the consequence seriously: for the people in the West Indies, not adverting to the circumstance of the injurious effects proceeding from the colouring substance, will suppose the cheese of the United States generally poisonous, and will of course decline purchasing it.

## ASSAY OF FOREIGN COINS.

#### REPORT.

THE Secretary of the Treasury, in obedience to the act, entitled "An act regulating the currency of foreign coins in the United States," respectfully

#### REPORTS-

That assays of the foreign gold and silver coins made current by that act, have been made at the mint of the United States, conformably thereto, the result whereof is shown in the letter of the director of the mint, dated November 22, 1811, which is annexed to this report, and which is prayed to be received as part thereof.

All which is respectfully submitted.

## ALBERT GALLATIN.

Treasury Department, Nov. 26, 1811.

(COPY.)

MINT OF THE UNITED STATES,

November 22, 1811.

SIR—Agreeable to your desire, I have caused assays to be made of the several species of foreign gold and silver coins, made current in the United States, by an act of Congress of the 10th April, 1806; the result of which, according to the assayer's report, is as follows:

Gold coins o	f Great P	nitain			
Gold collis o	oreat B	ricani.	1	C.	Grs.
No. 1. On five pieces of different	ent dates	, prior			
to the year .			1806,	22	0
2. On ditto, dated .			1806,	22	0
3. On ditto, dated .		£	1808,	22	0
4. On ditto, dated .			1809,	22	0
5. On ditto, dated .			1810,	22	0
888 per dwt.			,		
	s of Fran	CP.			
No. 1. On five pieces of differe					
to the year .			1806,	21	23
2. On five ditto, dated		- 1	1806,		
3. On five ditto, dated			1807,		
4. On two ditto, dated			1808,		
5. On two ditto, dated			1809,		_
6. On one ditto, dated			1810,		-
7. On five ditto, dated			1811,		-
$27 \frac{48}{100} \text{ grs.} = 1 \text{ dollar.}$	•	•	2011,	~-	- 2
$87 \frac{34}{100}$ cents = 1 dwt.	Average	of accar	70 91 9 5 1	near	lv.
X II A TO THE THE TO TH			3 21 211	icai	.,.
	ns of Spair				
No. 1. On four pieces of different	ent dates	, prior		00	4
to the year .	•	•	1806,	20	-
2. On three ditto, dated	. •		1806,	20	3

The property of the property of				C.	Grs.
3. On three ditto, dated			1807,	20	31
4. On three ditto, dated			1808,	20	3
5. On two ditto, dated			1809,	20	31
6. On three ditto, dated			1810,	20	31
7. On three ditto, dated			1811,	20	31
$28 \frac{53}{100}$ grs. = 1 dollar.					
$84 \frac{12}{100}$ cents = 1 dwt.	Ave	rage of assa	ys 20	32	ari,
Gold coins o	f Portu	ıgal.			
No. 1. On five pieces of different	t dates	, prior			12
to the year .			1806,	22	0
2. On two ditto, dated			1806,	22	0
3. On three ditto, dated	•		1807,	22	0
4. On five ditto, dated		•	1808,	22	0
5. On five ditto, dated	:		1809,	22	0
6. On five ditto, dated		•	1810,	22	0
88 § cents per dwt.					
Silver coins	of Fran	ice.		14	
				Drots.	
No. 1. On five crowns of differen		-	10		12
2. On five francs pieces of d		nt dates,	10	15	12
$1 \text{ crown}, = 110 \frac{1}{100} \text{ cer}$	nts.				
Five francs, $= 93 \frac{14}{100}$ .					
Silver coins					
No. 1. On five pieces of different	t dates	-			
to the year .	•	1806,	*		12
2. On ditto,	•	1806,		15	00
3. On ditto,	•	1807,		15	06
4. On ditto,		1808,		15	12
5. On ditto,		1809,	10	15	06
6. On ditto,	•	1810,		15	12
7. On ditto,		1811,	10	15	00
$100_{\frac{27}{100}} = a Spanish do$		3.0			
Average of assays, 10	15 7.	-11-12		100	

From the above report of the assayer, it appears,

1. That the gold coins of Great-Britain and of Portugal, are

all uniformly of the same quality, and exactly equal to that of the gold coins of the United States; and therefore their intrinsic value is at the rate of 100 cents for 27 grains, or 88 8-9 cents per dwt.

2. That the gold coins of France are all very nearly of the same quality. The average from the above assay being 21 2 5-11 nearly, will give their value at the rate of 100 cents for 27 48-100

grs. or 87 34-100 cents per dwt.

3. That the gold coins of Spain are somewhat variable in their qualities. The average from the above assay being 20 3 2-7, will give their intrinsic value at the rate of 100 cents for 28 53-100 grs. or 84 12-100 cents per dwt.

- 4. That the intrinsic value of the French crown, supposing its weight 18 dwts. 17 grs. is, from the above assay, 110 1-100 cents, and that of the Ecu or five franc piece of Napoleon, supposing its weight 16 dwts. 2 grs. (which is very nearly the average) = 93 14-100 cents.
- 5. That the silver coins of Spain are very nearly of the same uniform quality. The average from the above assay being 10 15 7 nearly, will give the intrinsic value of the Spanish dollar, if of the full weight of 17 dwts. 7 grs. = 100 24-100 cents.\*

(Signed)

R. PATTERSON.

The hon. Albert Gallatin, secretary of the treasury.

## DOMESTIC ECONOMY.

METHOD OF PRESERVING FRUIT WITHOUT SUGAR.

By Thomas Saddington.-Trans. Soc. of Arts, vol. 26.

THE expense of sugar is frequently urged as a reason for not preserving fruits, and to this may be added the uncertainty of success from the strong fermentable quality of many fruits. They may be preserved for a length of time without sugar, by baking or

<sup>.</sup> The above has been corrected from the books at the mint. Editor.

boiling, and then closely stopping them up; but if the cork become dry, the atmospheric air exchanges place with what is impregnated by the fruit, which then soon becomes mouldy; but fruits may be preserved in good condition by the following process, for two years, or for a longer time, even in hot climates; as some that were done in 1806, have been exposed in an upper room to the sun during the whole of the summer, without injury.

The fruit being clean picked, and not too ripe, is to be put into wine or porter bottles, as they are cheaper than gooseberry bottles, and more easily obtained. The bottles must be filled as full as they can be packed, and corks being stuck lightly into them, they are to be placed upright in a kettle of water, and heated gradually to about 160° or 170° of Fahrenheit; that is to say, until the water feels very hot to the finger, but does not scald. This degree of heat is to be kept up for half an hour, and then the bottles being taken out one by one, they are to be filled up to within an inch of the cork with boiling water, the cork fitted very close and tight, and the bottle laid on its side, that the cork be kept moist. To prevent fermentation and mould, the bottles are to be turned once or twice a week, for the first week or two, and once or twice a month afterwards.

When applied to use, some of the liquor first poured off serves to put into the pies, &c. instead of water, and the remainder being boiled up with a little sugar, will make a rich and agreeable syrup.

The fruit ought not to be cracked by the heat. They may be picked out of the bottles with a bent wire or iron skewer.

## APPLE JELLY.

PEEL and quarter a half bushel of white pippin apples, and throw them into cold water to prevent their becoming dark coloured. When all are done, put them into boiling water, and let them remain in it, until they are entirely stewed. Then pass the water and apples through a seive, or flannel; then proceed in making the jelly in the same manner as with currants. The juice

of a lemon must be put into the syrup. The peelings of the lemon must be cooked separately, with loaf sugar, and put into the jelly when finished.

## TOMATOE, OR LOVE-APPLE CATSUP.

SLICE the apples thin, and over every layer sprinkle a little salt; cover them, and let them lie twenty-four hours; then beat them well, and simmer them half an hour in a bell-metal kettle; add mace and allspice. When cold, add two cloves of raw shallotts cut small, and half a gill of brandy to each bottle, which must be corked tight, and kept in a cool place.

#### MUTTON HAMS.

MIX two ounces of brown sugar with an ounce of fine Bay salt, and half a table spoonful of salt petre; rub the ham therewith, and lay it in a deep dish; baste and turn it twice a day for three days; throw away the pickle which in this time will have drained from the ham, and wipe it dry. Rub it again with the same mixture of sugar, &c. one day, and baste it the next, for ten days, turning it every day. Smoke for ten days, (with green hickory, if possible.) The hams are best eaten cold.

#### GINGER WINE.

TO sixteen quarts of water, add one pound of ginger bruised, (not powdered), infuse it in boiling water, put it into a large jar, and let it stand 48 hours by the side of the fire; strain off into a cask, and add to it eight pounds of loaf sugar, seven quarts of brandy, the juice of twelve lemons, and of twelve bitter oranges; peel the skins of them very thin, which put into the spirits the night before, and pour the spirits off the skins, when you put it into the cask. Cork up the cask for three or four weeks till the liquor is fine, and shake the cask for the first week to dissolve the sugar: a very small quantity of isingglass helps to fine it.

#### CURRANT WINE.

FIFTY-FIVE pounds of currants, produced four and a half gallons of juice; this was put into a ten gallon keg, and 20 lbs. of sugar added, and then filled with water: as the liquor decreased by fermenting, and running over the bung, the deficiency was supplied by water: three pints of brandy were added. Well distilled apple brandy answers perfectly well. Light-coloured brown sugar, or clean Havanna sugar, should be used.

## BLACKBERRY WINE.

SQUEEZE fifty pounds of blackberries, strain them, and add 25 lbs. of New Orleans, or clean white Havanna sugar; put all into a ten gallon keg, and fill it with water. As it works add water, keeping the cask full. Add three pints of good brandy. The keg, if new, must be soaked with well distilled apple whiskey, or French brandy.

#### YEAST.

TO one gallon of water, add three pints of malt, and one quart of hops, boil to two quarts, and strain the liquor boiling hot, over as much wheaten flour, as will make it of the consistence of thickened milk; and when almost cool, add half a pint of good yeast, when done working put it into a jug or stone pot, with about two quarts of cold water over it, and every time you use it pour off the water, and return fresh, when what yeast is wanted has been taken. It will keep good for two weeks.

The working will be done in two days, and the yeast is then fit for use, and may be put into a jug until wanted.

Observation.—All the foregoing receipts are original, except the first, and are excellent: The Editor has proved them all, and can safely recommend them.

## TO MAKE CURRY POWDER,\*

TAKE six table spoonsful of Turmeric, one of Cayenne pepper, one of black pepper, one of ginger, two of salt, one tea spoonful of coriander seed, half a tea spoonful of cumming seed; all these must be ground very fine, and mixed well together.

# TO DRESS A CURRY.

was supplied by water; three pintered from he were added. Wen

FRY brown whatever you propose to curry, with a clove of garlic and an onion; put it into a stew-pan with some very strong gravy. Two table spoonfuls of the powder are sufficient for a small dish. Let all simmer, till the meat or fish be tender. If you have them, you may add tomatos, if not add pickles, and the juice of a lime.

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<sup>\*</sup> Communicated by a gentleman long resident in India.